

EXHIBIT A

IN THE COURT OF COMMON PLEAS OF ALLEGHENY COUNTY, PENNSYLVANIA

SILEC CABLE S.A.S.
Rue de Varennes Prolongee
77876 Montereau, Cedex
France,

Plaintiff

vs.

ALCOA FJARDAAL SF
1 Hraun,
Reydarfjordur 730
Iceland

Defendant.

: CIVIL DIVISION
:
: CASE No. _____
:
: Code: 180 – Declaratory Judgment
:
:
: **COMPLAINT FOR**
: **DECLARATORY JUDGMENT AND**
: **TO STAY AND ENJOIN**
: **ARBITRATION**
:
: Filed on behalf of:
: Plaintiff, Silec Cable
:
: Counsel for Plaintiff:
: Gale White (I.D. # 46485)
: Anthony L. Miscioscia (I.D. # 69215)
: Joshua A. Mooney (I.D. # 85945)
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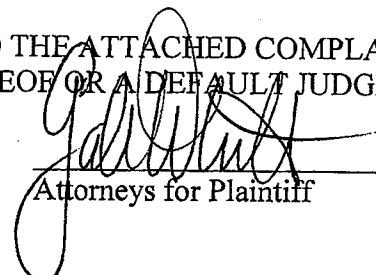
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NOTICE TO PLEAD:

TO DEFENDANTS:

YOU ARE HEREBY NOTICED TO PLEAD TO THE ATTACHED COMPLAINT
WITHIN TWENTY (20) DAYS FROM SERVICE HEREOF OR A DEFAULT JUDGMENT
MAY BE ENTERED AGAINST YOU.


Attorneys for Plaintiff

NOTICE TO DEFEND

YOU HAVE BEEN SUED IN COURT. If you wish to defend against the claims set forth in the following pages, you must take action within TWENTY (20) days after this complaint and notice are served, by entering a written appearance personally or by attorney and filing in writing with the court your defenses or objections to the claims set forth against you. You are warned that if you fail to do so the case may proceed without you a judgment may be entered against you by the court without further notice for any money claimed in the complaint of for any other claim or relief requested by the plaintiff. You may lose money or property or other rights important to you. **YOU SHOULD TAKE THIS PAPER TO YOUR LAWYER AT ONCE. IF YOU DO NOT HAVE A LAWYER OR CANNOT AFFORD ONE, GO TO OR TELEPHONE THE OFFICE SET FORTH BELOW TO FIND OUT WHERE YOU CAN GET LEGAL HELP.**

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**COMPLAINT FOR DECLARATORY JUDGMENT AND TO STAY AND ENJOIN
ARBITRATION**

By way of this Complaint, Silec Cable S.A.S. (“Silec”) alleges as follows:

1. This suit involves an explosion at an Alcoa aluminum plant in Iceland (“the Plant”) on December 18, 2010 which Alcoa Fjardaal SF (Iceland) (an affiliate of Alcoa, Inc. (U.S.))

(herein "Alcoa") has asserted caused over \$18,000,000 in damages, including consequential damages.

2. Within days of the fire Alcoa determined that its insurance had a \$50 million deductible, the construction warranty had expired and its only avenue for recovery was to find a latent defect. Alcoa began to develop such a claim.

3. Plaintiff, herein, Silec Cable, had been involved in two specific things relating to the construction of the Plant and there were separate contracts for each element of Silec's work:

(a) the design, manufacture and supply of certain components of the Plant, including cable and cable terminations, which were supplied pursuant to a Purchase Order dated December, 2005. The Purchase Order, by its terms, is governed by the law of Pennsylvania (see Ex. 1 to Alcoa's Request for Arbitration ("Arbitration Demand", attached at Ex. A hereto) at C1.0013); a copy of Alcoa's Arbitration Demand with exhibits is attached hereto as Exhibit A); and

(b) the installation of the cable and terminations which was done pursuant to a Services Contract dated September, 2006. (See Exhibit B hereto, attaching relevant portions of the Services Contract.)

4. The Purchase Order contains an arbitration clause. The Services Contract does not.

5. The Services Contract contains many limits on damages including that the damages recoverable for breach are limited to one tenth ($1/10^{\text{th}}$) of the contract price -- which would limit recoverable damages to approximately \$60,000, far less than the alleged \$18,000,000 loss.

6. After the explosion, Alcoa investigated the cause and provided reports from two entities, Kevin Kennedy Associates (“KKA”) and KEMA Nederland B.V. (“KEMA”). (See Exs. 2, 3 and 4 to Arbitration Demand (Ex. A hereto).)¹

7. Neither of these Reports conclude that the design or manufacture of the cable and cable terminations performed under the Purchase Order was the root cause of the explosion.

8. In fact, the Reports point to causative events that occurred after the design and manufacture of the cable and cable terminations.

9. Notwithstanding the KKA and KEMA Reports, Alcoa asserts that the cable and terminations had a latent defect and has commenced an arbitration against Silec in Pittsburgh, Pennsylvania, under the Purchase Order seeking to recover the over \$18,000,000 in alleged explosion damages (“the Pennsylvania Arbitration”). (See Ex. A, Arbitration Demand.) (Although Sagem S.A. (“Sagem”) was also named in Alcoa’s Arbitration Demand, upon information and belief, Sagem has not yet been served with the Arbitration Demand.)

10. Alcoa’s motivation in bringing the Arbitration under the Purchase Order is clear – Alcoa seeks to avoid the clear provisions in the Services Contract which would limit Alcoa’s recovery from Silec to only a fraction of its alleged explosion losses, and to implicate the Purchase Order’s warranty by falling within the latent defect provision extending the length of the one year warranty period.

11. Accordingly, for the reasons set forth below, and in Silec’s Petition for Stay and/or Preliminary Injunction² and pursuant to Pa. C.S.A. § 7304 and Pa. R.Civ. P. Rule 1601 et seq., and the Declaratory Judgments Act, 42 Pa. C.S.A. § 7531 et seq., this Court should:

¹ Silec references the reports of KKA and KEMA because they are attached to and referenced in Alcoa’s Arbitration Demand. In doing so, Silec does not waive any right to object to those reports or their admissibility, or to challenge the bases for and sufficiency of the purported opinions contained therein.

- (a) Stay or enjoin the Pennsylvania Arbitration, pending a resolution of whether Alcoa's claim is arbitrable;
- (b) Declare that Alcoa's claim is not arbitrable; and
- (c) Declare that Silec has no liability for any alleged damages that resulted from the December 11, 2011 explosion.

THE PARTIES

12. Plaintiff Silec Cable, S.A.S. is a manufacturer of insulated cable systems that operates as a subsidiary of the United States company, General Cable Corp.

13. Defendant Alcoa Fjarooal is organized under the laws of Iceland and is an affiliate of Alcoa, Inc. Alcoa, Inc. is principally located in and regularly does business in Allegheny County, Pennsylvania.

VENUE

14. Pursuant to Pennsylvania Rules of Civil Procedure Rules 1006 and 2130, venue for this action is proper in Allegheny County, Pennsylvania.

15. On or about July 31, 2012, and employing the Pittsburgh, Pennsylvania law firm of K&L Gates LLP, Alcoa made a Request for Arbitration (the "Arbitration Demand") against Silec seeking to arbitrate in Pittsburgh, Pennsylvania and under Pennsylvania law Silec's purported liability to Alcoa for damages allegedly resulting from the fire ("the Pennsylvania Arbitration"). A true and correct copy of Alcoa's Request for Arbitration and the exhibits thereto are attached hereto at Exhibit A.

16. Silec disputes the arbitrability of the Pennsylvania Arbitration as well as disputes liability for the claims asserted therein.

² In addition to filing this Complaint, Silec intend to also file with this Court a Petition for Stay and/or Preliminary Injunction, to be supported by a related Memorandum of Law.

17. The Pennsylvania Arbitration is to take place in Pittsburgh, Pennsylvania and to be decided under Pennsylvania law. (See Arbitration Demand (Ex. A hereto) at C1.0013 & C1.0021.)

18. As such, the causes of action asserted in this Complaint arise out of a transaction and/or occurrence that took place in Allegheny County, Pennsylvania.

19. Additionally, as Alcoa is an affiliate of Alcoa, Inc. (which is principally located in Pittsburgh, Pennsylvania) and upon information and belief concerning Alcoa, Inc.'s role and interest in the Plant as defined below, venue is further proper in Allegheny County to the extent that Alcoa regularly conducts business in this County.

RELEVANT FACTUAL BACKGROUND

20. Alcoa's Arbitration Demand arises out of a December 18, 2010 explosion and fire occurring at an Alcoa aluminum production plant located in Iceland.

A. Alcoa's Fjardaal Plant

21. In 2003, Alcoa, Inc. approved plans for the construction of a 322,000 metric ton aluminum smelter plant ("the Plant") in Eastern Iceland which was scheduled to begin production in 2007. Alcoa, Inc. later established Alcoa Fjardaal as a subsidiary to operate the Plant.

22. In March, 2003, Alcoa, Inc. finalized its agreements with the Government of Iceland and Iceland's National Power Company to build the Plant.

23. Alcoa, Inc. chose Bechtel International Inc. and/or Bechtel Overseas Corporation (collectively "Bechtel"), two America companies, to work with Alcoa to design and build the Plant.

24. In late 2003, Alcoa, Inc. and Bechtel with consultants from Carnegie Mellon University began working on a design for the Plant.

25. Bechtel performed engineering, procurement and project management for Alcoa for the Plant.

26. On behalf of Alcoa, Bechtel entered into two contracts relevant to this dispute related to the Plant: one entered in 2005 for the purchase of certain equipment from Sagem (and later supplied by Silec) (the "Purchase Order") and the second entered into in 2006 for the installation of that equipment (the "Services Contract").

B. The Purchase Order

27. On or about December 16, 2005, Bechtel Overseas Corporation, while acting as an agent of Alcoa, entered into a Purchase Order (the "Purchase Order") governed by Pennsylvania law to provide for the design, manufacture, factory testing and delivery of high voltage power cables and cable termination equipment for the Plant. (See Arbitration Demand (Ex. A hereto) at Ex. C1.)

28. Bechtel Overseas prepared, drafted, executed and issued that Purchase Order.

29. During the contracting process for the Purchase Order, Sagem dealt directly with Bechtel. Silec was not a signatory to the initial Purchase Order.³

30. The Purchase Order provided for the purchase of certain equipment related to the Project, including power cables and termination equipment.

31. Importantly, and as described in detail below, the Purchase Order did not specify or require installation of the cable termination equipment.

32. The scope of work was described in the Purchase Order as, *inter alia*:

Design, manufacture, factory testing and delivery of High Voltage Power Cables and Cable Terminations Equipment as specified in specification for E-Electrical 220 kV High Voltage Power Cables and 33 kV High Voltage Power Cables. . . .

³ The cable assets of Sagem were transferred to Silec on November 30, 2005.

Furnish all labour, materials and services for the design, fabrication, testing and delivery of the Products specified in accordance with this Material Requisition and all attachments hereto, and any resultant Purchase Order and all attachments thereto.

* * *

Packing and Shipping in accordance with Packing and Shipping Instructions - Section 7.

(See Arbitration Demand (Ex. A hereto) at C1.0002.)

33. Section 1, subsec. 1.2, entitled Work Not Included, however expressly listed “Cable routing. Civil Installation. Pulling, termination and connections.” as among the work not included. (See Arbitration Demand (Ex. A hereto) at C1.0006.)

34. Instead, the Purchase Order merely provided for some technical assistance and guidance during installation “so as to ensure the PRODUCTS bec[a]me fully operational”, which they did. (See Arbitration Demand (Ex. A hereto) at C1.0016, Sec. 4B, Art. 4.1.)

35. The installation performed by Silec was covered by a separate agreement, called the Construction Services Order (“the Services Contract”). (See Exhibit B hereto).

36. Underscoring this limitation in scope of work, the Purchase Order stated that:

9. SELLER’S TECHNICAL SERVICES

SELLER will provide services of Seller’s Representative at the project jobsite for guidance during installation, erection, commissioning, start-up or operator training, as required by BUYER, as per the terms and conditions defined in Section 4B Special Conditions, Article 4.

(See Arbitration Demand (Ex. A hereto) at C1.0005.)

37. Article 4 of Section 4B Special Conditions, referenced above, stated that:

4. ON-SITE SERVICES OF SELLER'S REPRESENTATIVES:

The following conditions will apply in the event the BUYER requires the services of SELLER'S Representative(s) at the Project site to provide guidance during installation, erection, commissioning, start-up or operator training. . . . A technical service contract may be issued at a later date by BUYER, if required.

4.1 Scope of Services

SELLER'S Representative(s) is required to provide technical assistance, expert guidance and direction to BUYER during installation of SELLER'S PRODUCTS, so as to ensure the PRODUCTS become fully operational in accordance with the requirements of this AGREEMENT.

(See Arbitration Demand (Ex. A hereto) at C1.00016 (emphasis added).)

38. The Purchase Order contemplated a subsequent contract providing for installation services. (See Arbitration Demand (Ex. A hereto) at C1.00016, Art. 4 (stating that "[a] technical service contract may be issued at a later date" for installation services).)

39. The Purchase Order also has a limited warranty provision, the pertinent language of which is omitted from Alcoa's Arbitration Demand. That warranty covers the design and manufacture of the cables, not the installation. (See Arbitration Demand (Ex. A hereto) at C1.0010, Art. 9.)

40. The Warranty begins by stating that "SELLER warrants that the PRODUCTS shall be free from liens and from defects in design, material, workmanship, and title." (See Arbitration Demand (Ex. A hereto) at C1.0010, Art. 9.)

41. Excluded from Alcoa's Arbitration Demand is that the Warranty then provides that if any PRODUCT does not conform within the warranty period, and the SELLER is so notified, "SELLER shall promptly correct such nonconformity", stating:

...[if] it appears that the PRODUCTS, or any part thereof, do not conform to these warranties, and BUYER so notifies SELLER within the warranty period, SELLER shall promptly correct such nonconformity to the satisfaction of the BUYER, at SELLER'S sole expense[.]

(Id. (emphasis added).)

42. The Warranty further states that if Alcoa rejects or revokes acceptance of the correction, Alcoa may make "any reasonable purchase of PRODUCTS in substitution," SELLER will be responsible for "any additional costs for such substituted PRODUCTS" or other similar remedy:

...BUYER may reject or revoke acceptance, and cover by making any reasonable purchase of PRODUCTS in substitution for those rejected and the SELLER will be liable to the BUYER for any additional costs for such substituted PRODUCTS; or BUYER may proceed to correct SELLER'S nonconforming work by the most expeditious means available, and the costs for such correction shall be for SELLER'S account; or BUYER may retain the nonconforming PRODUCTS and an equitable adjustment reducing the order price to reflect the diminished value of such nonconforming PRODUCTS will be made by written revision.

(Id.)

43. To further emphasize the limited scope of the warranty, the provision further states that the "SELLER'S liability hereunder shall extend to all damages proximately caused by the breach of any of the foregoing warranties, including incidental damages, such as disassembly, removal, inspection, re-installation, re-testing, costs of transportation or warehousing."⁴ (Id.)

⁴ In the Arbitration Demand, Alcoa characterizes this provision as an expansion of the Warranty. It is not – under the construction canon of ejusdem generis and Pennsylvania law, the provision further limits the Warranty.

44. Thus, the Warranty, limited only to PRODUCTS, required the SELLER only to correct any nonconformities identified by the BUYER during the Warranty period, including providing such other costs as disassembly, inspection, or re-testing of the PRODUCT.

45. The Purchase Order defined "PRODUCT" as "the goods, materials, articles, equipment, supplies, drawings, data, processes and all other property and services, including design, expediting, inspection, delivery, installation, and testing, specified or required to furnish the items ordered hereunder." (*Id.*, C1.0014 (emphasis added).)

46. To further underscore the limited scope of liability under the Warranty, the Purchase Order also expressly prohibits any and all consequential damages, including loss of property, business, product or profits, which is what Alcoa seeks in the arbitration. The Purchase Order states:

18. RELEASE OF CONSEQUENTIAL DAMAGES: SELLER will not be responsible for or held liable to BUYER or OWNER for consequential damages, including, without limitation, liability for loss of use of the Project, facilities or loss of use of property; loss of profits; loss of product or business interruption; special, punitive or exemplary damages, however the same may be caused. This provision shall survive any termination of this AGREEMENT.

(*Id.*, C1.0013.)

47. The Purchase Order also provided for shipping "FOB Port of Export, Le Harve France." (*See* Arbitration Demand (Ex. A hereto) at C1.0004, Section 1, subsec. 3.) Alcoa was responsible for shipping.

48. The Purchase Order further provided that "[u]pon such delivery ,SELLER shall cease to bear the risk of loss or damage; provided however, that any loss or damage, whenever occurring, which results from SELLER's nonconforming packaging or crating shall be borne by SELLER." (*See* Arbitration Demand (Ex. A hereto) at C1.0008, Section 4A, Art. 6.)

49. Alcoa makes no claim that Silec's packaging or crating was nonconforming or in any way deficient. Silec delivered the product for shipping without issue.

50. The Purchase Order contains an Applicable Law provision in Section 4A, Art. 17, which provides that:

The definition of terms used, interpretation of this AGREEMENT and rights of the parties hereunder shall be construed under and governed by the laws of the jurisdiction of the State of Pennsylvania, USA.

(See Arbitration Demand (Ex. A hereto) at C1.0013.)

51. The Purchase Order contained a Dispute Resolution provision, that is at issue here. In Article 9, Section 4B of the Special Conditions, the Purchase Order states in part as follows:

Any claim arising out of or attributable to the interpretation or performance of this AGREEMENT, which cannot be resolved by negotiation shall be considered a dispute within the meaning of this clause.

If for any reason BUYER and SELLER are unable to resolve a claim for an adjustment, BUYER or SELLER shall notify the other party in writing that a dispute exists and request or provide a final determination by BUYER. Any such request by SELLER shall be clearly identified by reference to this clause and shall summarize the facts in dispute and SELLER'S proposal for resolution.

BUYER shall, within ten (10) calendar days of any request by SELLER, provide a written final determination setting forth the contractual basis for its decision and defining what adjustments it considers equitable.

* * *

If BUYER'S final determination is not accepted by SELLER, the matter shall, be referred to senior executives of the parties who shall have designated authority to settle the dispute. If the dispute remains unresolved, the Parties agree that the dispute shall be referred to mediation by a mediator agreed by the Parties with the mediation to be conducted as agreed between the Parties ("Mediation"). . . . The Parties agree to use their best endeavors and to negotiate in good faith to resolve any dispute at Mediation

and will ensure that their respective representatives involved in any Mediation have full power and authority to settle the dispute.

If the dispute has not been resolved within seven (7) calendar days of the conclusion of the Mediation convened, the Parties agree that the dispute shall and is hereby referred to binding arbitration by three arbitrators. . . .The Arbitration shall be conducted in accordance with the rules of the ICC and shall be held in Pittsburgh, Pennsylvania and the decision of the Arbitration shall be final and conclusive save where ICC rules permit appeal therefrom.

(See Arbitration Demand (Ex. A hereto) at C1.0021.)

52. Silec completed all of its obligations under the Purchase Order and the arbitration provision in the Purchase Order is not implicated in any way.

C. Fuji Supplied The Transformer and Cable Junction Box

53. Silec was not the only supplier or installer working for Alcoa on the Plant.

54. Fuji (among other things) manufactured and installed a 220 kV transformer and cable junction box at the Plant. The cable junction box is the place into which the Silec cable termination was installed/ended.

55. The Plant was in operation for over three years from the time of commission – with Silec having no role or contact with the Plant in any way. On the other hand, Fuji had regular contact with the Plant, including several interventions into the cable junction box – the last such intervention, according to the KEMA Report attached as Ex. 3 to Alcoa’s Arbitration Demand, being in December 2010, just before the fire.

D. The Services Contract

56. After delivery of the cable termination equipment, Bechtel International, Inc., on or about August 11, 2006 and acting as the agent of Alcoa, entered into a Construction Services Order (“the Services Contract”) with Silec in connection with the installation of the cable termination equipment. (See Ex. B hereto.)

57. In an apparent attempt to obscure the absence of any arbitration provision in the Services Contract and to avoid application of the damage and liability limitations and cap in that contract, Alcoa did not attach the Services Contract to its Arbitration Demand.

58. The Services Contract was prepared, drafted and executed by Bechtel, as agent of Alcoa.

59. The Services Contract expressly superseded all other writings between Alcoa and Silec, stating that “This contract embodies the entire agreement between OWNER and CONTRACTOR and supersedes all other writings. The parties shall not be bound by or be liable for any statement, representation, promise, inducement or understanding not set forth herein.” (See Ex. B, Schedule, Item 4.)

60. “Work” under the Services Contract included the “supply of technical expertise, supervision and other Work necessary to terminate” the cable terminations, and perform related connection of cables as necessary, and testing and commissioning. (*Id.*, App. D., Art. 1.1).

61. Silec also was to “supervise the laying out” of 220KV and 33KV high voltage cable, and to provide “All expertise, labour, material and equipment necessary to perform termination assembly.” (*Id.*)

62. The Services Contract also contained an express damage limitation provision, providing:

SC-2 LIABILITY CAP

Except for CONTRACT’S indemnity obligations as set forth in SC-1 MODIFICATIONS TO EXHIBIT “A” item 9 titled “INDEMNITY”[,], ***CONTRACTOR’S total aggregate liability arising out of or in connection with this contract shall not exceed 10% of the total amounts paid to CONTRACTOR under the CONTRACT. Under no circumstance shall CONTRACTOR be liable or special, incidental, indirect or consequential damages***

including but not limited to the loss of revenue or loss of anticipated profit, loss of goodwill, suspended or [de]creased business activity.

(Id., App. B, Art. 18, SC-2.) (emphasis added).

63. The price for the work provided under the Services Contract was approximately \$600,000 U.S. dollars – establishing a Liability Cap of approximately \$60,000 U.S. dollars. (See Services Contract at Ex. C thereto, ¶ 2.0.)

64. The Services Contract also provided a limited warranty that stated in part as follows:

[Silec] warrants that all equipment and material it furnishes and all work it performs against defects in design, equipment, materials or workmanship for a period from Work commencement to a date twelve (12) months after completion and acceptance of the Fjardall project as a whole ...

(See Services Contract at Ex. A thereto, ¶ 8.)

E. Silec Performed Under Both Contracts and the Plant Commenced Operations

65. Silec completed all of its obligations under the Services Contract.

66. Silec completed its scope of work on or about March 16, 2007, and Bechtel accepted the work of Silec.

67. In 2007, the Project was completed and the Plant began production.

68. In June of 2007, the CEO and President of Alcoa, Inc. attended and spoke at the Grand Opening of the new Alcoa Plant, with among others the CEO and Chairman of Bechtel and the Prime Minister of Iceland.

69. Over the next three years, Alcoa operated the Plant.

70. Upon information and belief, Bechtel ran the project for the Plant for Alcoa– from the time the project was designed with Carnegie Mellon, through the contracting process, through construction and eventually through the Grand Opening.

71. From the time the Plant went into operation in June of 2007 until December 2010, there were no communications to Silec, or to related entities such as General Cable Corporation, relating to any perceived or purported problems and there were no indications of any problems with Silec's products or work.

F. Fuji's Maintenance Work

72. After the Plant was put into operation, Fuji Electric, which, among other things, supplied the transformers and cable junction box, performed certain maintenance on the power cables and terminations and provided other interventions at the Plant between the time of installation and the time of the fire, including maintenance of certain cable junction boxes and/or on bushings in, according to the Reports attached to Alcoa's Arbitration Demand, 2008 to December 2010.

73. Of significance, increased acetylene levels were detected immediately following certain Fuji arrester bushing and degassing work performed in 2009, as reflected in the DGA Results Over Time table appended to the KEMA Report attached to the Arbitration Demand. (See Arbitration Demand (Ex. A hereto) at C3.0025.)

74. These DGA results suggest that Fuji may have caused or contributed to the problem and/or evidence that Fuji and/or Alcoa were or should have been alerted to a problem that perhaps could have been identified and corrected before any explosion and fire.

75. The cable terminations are surrounded by oil. If there was a crack in the insulation as Alcoa avers and there was a related oil leak at the termination, any such leak should have been noticed during Fuji's intervention.

76. Neither Fuji nor Alcoa told Silec about what they discovered at the time of Fuji's maintenance/intervention.

G. The December 2010 Explosion And Fire And Subsequent Investigation

77. On December 18, 2010, an explosion and fire occurred at the Plant.

78. Within days after the fire, Alcoa recognized the importance of claiming there was a hidden defect in Silec's product.

79. In a December 30, 2010 PowerPoint, prepared only days after the fire, Alcoa stressed that its own insurance was subject to a \$50 million deductible and that the Silec construction warranty (which was for a one year period) had expired. See Ex. C hereto, attaching cover page and page 24 from an Alcoa PowerPoint.

80. That December 30, 2012 PowerPoint concluded that "[t]he only relevant avenue is if there is a hidden defect." (See id.)

81. Upon information and belief, Alcoa worked to develop a cause and origin theory consistent with that only relevant avenue.

82. After the fire, Alcoa retained Kevin Kennedy Associates ("KKA") to conduct an investigation into the root cause of the fire. (See Arbitration Demand (Ex. A hereto) at ¶ 29.)

83. KKA traveled to the Plant to assess the fire scene and collect artifacts. (Id. at ¶ 30.)

84. On March 4, 2011, KKA issued a report, which Alcoa later shared with Silec, concluding that the fire originated from a failure of electrical insulation within one of the cable termination assemblies and that the fire most probably happened during installation. (Id. at ¶¶ 31-33.)

85. Thereafter, Alcoa provided the KKA Report to a second company, KEMA Nederland B.V. ("KEMA"), and asked KEMA to review the KKA Report and further investigate, among other things, the possible causes of the fire. (See Arbitration Demand (Ex. A hereto) at Ex. 3.)

86. Alcoa now relies upon the KKA Report and the KEMA Report to support its arbitration claim against Silec and references alleged damage to the cable caused during installation in its demand. (See Arbitration Demand (Ex. A hereto) at Exs. 2, 3 and 4.)

87. Pursuant to a KKA Report dated May 20, 2011 (and attached as Ex. 4 to the Arbitration Demand), KKA concluded that a cable insulator (provided and installed by Silec) was cracked before Fuji performed maintenance work in 2008 or 2009. (Silec does not concede when the crack occurred or existed.)

88. However, the KKA Report does not identify when the crack occurred. Rather, the KKA Report simply says that termination oil was drawn into the cable box (through the alleged crack) when the termination was tested and prepared for service in 2007 and when Fuji performed repair work in 2009. (See Arbitration Demand (Ex. A hereto) at C4.0007.) As such, the KKA Report does not rule out the possibility that any purported cracking occurred after design and manufacture of the product – such as during transportation by Alcoa or installation by Silec.

89. KEMA also does not specify when the crack supposedly occurred – instead identifying three points in time that the cracking of the epoxy insulator *could* have happened: (1) during transportation; (2) during installation; or (3) during maintenance work of Fuji carried out in 2008/2009. (See Arbitration Demand (Ex. A hereto) at C3.0018.) None of these points in time involve the Purchase Order.

90. As such, the KEMA Report does not conclusively identify the purported root cause of the fire as a latent defect in Silec's cable termination; moreover, each of the three points in time identified by KEMA involve something that occurred after design and manufacture. (See id., C4.0003, 0009.)

91. Silec disputes and repudiates the conclusions of the KKA and KEMA Reports that Silec caused the fire by its actions.

92. Moreover, as discussed further below, the conclusions in those Reports, even if correct (which Silec disputes), demonstrate that this claim is not arbitrable – as Alcoa’s claim is not one arising from the interpretation or performance of the Purchase Order but rather, at best, the claim as stated is under the Services Contract.

H. Alcoa’s Arbitration Demand

93. By letter dated March 16, 2012, Alcoa Europe, a division of Alcoa, Inc., wrote to General Cable, the U.S. parent company of Silec, about the explosion and fire at the Plant. A true and correct copy of which letter is attached hereto as Ex. D.

94. In the March 16 letter, Alcoa claimed that Silec was responsible for the fire and all resulting damages. (See Ex. D.)

95. Referencing the KKA Report and the KEMA Report, Alcoa blamed the explosion and fire, and resulting damage, on Silec. (See Ex. D.)

96. However, despite purporting to invoke the Purchase Order’s Dispute resolution provision, Alcoa admitted its own doubt that the claim was arbitrable – noting that the Dispute Resolution provision of the purchase contract required that the parties first mediate before Alcoa could proceed with further legal action and stating “we doubt the parties intend the provision to apply to this type of dispute.” (See Ex. D at p. 1.)

97. By letter dated April 12, 2012, Silec responded to Alcoa. (Ex. A, Arbitration Demand (Ex. A hereto) at C5.).⁵

⁵ Silec preliminarily responded on March 23, 2012, requesting a short extension of time to respond to Alcoa’s letter, which extension Alcoa granted.

98. The April 12 letter advised Alcoa that Silec continued to deny any liability for the transformer fire and further emphasized that, to the extent that Alcoa was claiming that the insulator cracked during installation by Silec, the installation was covered by a separate stand-alone agreement that did not contain any agreement to arbitrate. (Id.)

99. Several months passed, without further word from Alcoa in response to Silec's letter. Then, on or about July 31, 2012, Alcoa's Pittsburgh counsel, K&L Gates, LLP, served a Arbitration Demand seeking to arbitrate with Silec in Pittsburgh, Pennsylvania, under Pennsylvania law. (See Arbitration Demand (Ex. A hereto) at ¶¶ 52-53.)

100. Despite the lack of any definitive evidence or conclusions in the KKA and KEMA Reports that there was in fact a latent defect in Silec's cable termination, Alcoa's Arbitration Demand avers that Silec was liable because of a latent defect⁶ that existed prior to transportation or installation – and thus argued (incorrectly) that its claim solely related to the Purchase Order and thereby fell within the arbitration provision of the Purchase Order. (See Arbitration Demand.)

101. For the reasons set forth herein, Alcoa is wrong. Its claim is not arbitrable and, as such, Silec is entitled to a stay and an injunction prohibiting Alcoa and its counsel from continuing with the Pennsylvania Arbitration. Further, Silec is not liable for the fire or the claim asserted in the Pennsylvania Arbitration.

⁶ Notably, to justify their opinions, both Reports conclude that there was a measure of combustible gases in the oil at the time Fuji performed its maintenance work and that, according to KEMA, as early as 2008, there was "an indication that something had happened." (See Arbitration Demand, C3.0019, C.4.009.) Thus, the KEMA Report also refutes that the defect was latent, an allegation Alcoa must make in order to fit within the warranty period of the Purchase Order. This inconsistency is just another illustration of the measures Alcoa has taken in order to shoehorn its claim within the arbitration clause of the Purchase Order.

COUNT I – STAY AND/OR INJUNCTION PRECLUDING ARBITRATION

102. Silec restates the allegations set forth in paragraphs 1 through 101 of this Complaint and incorporates them by reference herein.

103. Silec requires and is entitled to a stay and/or injunctive relief prohibiting arbitration of this non-arbitrable dispute.

104. Silec requires entry of an injunction to prevent immediate and irreparable harm that cannot be adequately compensated by damages.

105. If an injunction is not entered, Alcoa will be allowed to continue arbitrating a dispute that is not arbitrable, thereby depriving Silec of its due process rights to its day in court.

106. Greater injury would result from refusing an injunction than from granting it, and, concomitantly, issuance of an injunction will not substantially harm other interested parties in the proceedings.

107. Should an injunction not be granted, Silec will be forced to arbitrate claims that it has not agreed to arbitrate. However, should an injunction be granted, Alcoa will not be harmed, as it can assert its right to arbitrate in this case and, should it prevail, resume its arbitration.

108. Entry of a preliminary injunction will properly restore the parties to their status as it existed immediately prior to the alleged wrongful conduct, i.e., Alcoa's institution of the Pennsylvania Arbitration.

109. Entry of the requested injunction is reasonably suited to abate the offending activity.

110. The requested injunction stays the Pennsylvania Arbitration while the parties litigate in this Court – the proper forum – whether the dispute is arbitrable. If it is not, the Pennsylvania Arbitration will be stopped before the parties waste any further time and money

arbitrating a non-arbitrable dispute. If the dispute is arbitrable, the parties can resume that arbitration.

111. A preliminary injunction will not adversely affect the public interest.

112. The dispute between Alcoa and Silec is a private dispute, that does not involve the public interest.

113. Finally, the activity Silec seeks to restrain (i.e., the Pennsylvania Arbitration) is actionable. Silec's right to relief is clear – because, as detailed in paragraphs 114 to 163 below, Alcoa's claims are not arbitrable and thus Silec not only is likely to prevail on the merits, but will do so.

A. Alcoa's Claim Is Not Arbitrable Because It Does Not Fall Within The Purchase Order

114. The arbitration clause does not apply, and this matter is not arbitrable, because the Purchase Order which contains the only arbitration agreement, does not apply.

115. Neither Report cited by Alcoa claims the alleged defect – a crack in the insulator epoxy, which Silec does not concede existed prior to the explosion and fire –happened prior to installation of the cable termination equipment.

116. According to the KEMA Report (upon which Alcoa's March 16, 2012 letter and its Arbitration Demand depend), "the root cause" of the explosion and fire was "a crack in the epoxy resin insulator of the cable termination that got this crack during or before the installation work in or before 2007." (See Arbitration Demand (Ex. A hereto) at C3.0018 (emphasis added).)

117. The KEMA Report further notes that the crack in the insulator "probably" happened during transportation of the equipment or installation. (Id., C1.0018.)

118. The KEMA Report also speculates that the crack could have been caused, i.e., occurred, "during the maintenance work by Fuji [Electric Corporation] carried out in 2008/2009",

although KEMA elsewhere opines that it was “most probable” that the crack in the insulator existed “on commissioning”—i.e., during transportation or installation of the cable termination equipment. (Id.)

119. As such, Alcoa’s own reports point to causative events that occurred after design and manufacture of the cable termination and insulation.

120. The Purchase Order and its arbitration provision, however, are not implicated where, as suggested by KEMA, the alleged crack occurred sometime after design and manufacture, such as during transportation by Alcoa, during installation by Silec or during maintenance by Fuji.

121. Alcoa wrongly concludes that *installation* of the cable termination equipment falls within the Purchase Order in an attempt to confine its claim solely to the Purchase Order in order to invoke arbitration. For example, Alcoa pleads that Silec is “solely and completely responsible” because “[Silec] had designed, manufactured, and installed the Defective Assembly.” (See Arbitration Demand (Ex. A hereto) at ¶ 33 (emphasis added).) Alcoa also pleads that Silec “agreed to design and manufacture fifteen (15) separate cable termination assemblies, which [Silec] would then install one-by-one inside the cable junction boxes in each phase of the Fuji-manufactured transformers.” (Id., ¶ 19 (emphasis added).)

122. Installation work performed by Silec, however, was not governed by the Purchase Order and thus not subject to its provisions.

123. The reason why Alcoa strives to confine its claim to the Purchase Order is crystal clear. If Alcoa were to allege a claim under the Services Contract which covers installation, then Alcoa’s recovery would be limited to one tenth of the contract price, as well as would be

precluded from recovering special, incidental, indirect or consequential damages – which appear to form the majority of Alcoa’s alleged damages.

124. At the same time, Alcoa’s Arbitration Demand and theory of liability is inconsistent with its Reports which contend that the alleged crack in the epoxy insulator occurred during transportation, installation or possibly thereafter.

125. Alcoa’s Arbitration Demand, therefore, also potentially implicates, at best, work performed under the Services Contract, which claim is not arbitrable because the Services Contract does not have an arbitration clause.

126. Alcoa further alleges that “Pursuant to the **Purchase Order**, [Silec] completed installation of” the cable termination equipment. (Id. (underline added, bold in original).) This is incorrect. The Services Contract covers installation.

127. Alcoa further alleges that “Notwithstanding [Silec’s] unfounded denials [against liability], as will be proven in this arbitration, the evidence supports the following inescapable conclusions: (i) Pursuant to the **Purchase Order**, [Silec] designed, manufactured, and installed the Defective Assembly.” (See Arbitration Demand (Ex. A hereto) at ¶ 41 (underline added, bold in original).)

128. Thus, as pleaded, Silec’s alleged liability is based at least in part on Silec’s installation of the equipment and its work under the Services Contract.

129. In a footnote, Alcoa attempts to explain away the Services Contract by averring that the Services Contract “expressly excludes from its scope” the “provision of permanent material,” and that the cable termination equipment “were unquestionably ‘permanent material.’” (See Arbitration Demand (Ex. A hereto) at ¶ 19, n.1.) In doing so, however, Alcoa ~~even~~ admits that by entering into the Services Contract, “Respondent Silec Cable agreed to provide certain

services related to the installation of cable termination equipment at the **Smelter Facility.**" (Id. (underline added, bold in original).) This admission ~~also~~ is fatal to the arbitrability of Alcoa's claim.

130. Further, the language in the Services Contract cited by Alcoa only says that the provision of permanent materials under the Purchase Order are not superseded by the Services Contract, e.g. thus preserving things like the warranty for design and manufacturing defects.

131. Alcoa's claim is not for design or manufacturing defect.

132. The claim, therefore, is not subject to the Purchase Order's arbitration clause and, therefore, is not arbitrable.

B. Alcoa's Claim Is Not Arbitrable Because Alcoa's Arbitration Demand Is Not Based On Interpretation Or Performance Of The Purchase Order

133. Even if Alcoa stated a claim under the Purchase Order, which it does not, Alcoa fails to state a claim that falls within the arbitration provision in the Purchase Order.

134. Not everything that is related (or allegedly related), even remotely, to the Purchase Order is arbitrable.

135. The arbitration provision in the Purchase Order is limited in its scope and applicability.

136. The Purchase Order's arbitration clause expressly is limited to claims "arising out of or attributable to the interpretation or performance of this AGREEMENT." (See Arbitration Demand (Ex. A hereto) at C1.0021.)

137. If this criteria is not met, there can be no arbitration.⁷

⁷ As a condition precedent under the arbitration clause of the Purchase Order, Alcoa must notify Silec in writing that a dispute exists and request or provide a final determination. To the extent that Alcoa has failed to satisfy these conditions, Alcoa's Arbitration Demand, at best, is premature and fatally flawed.

138. Here, however, Alcoa's claim does not arise out of the interpretation or performance of the Purchase Order.

139. Alcoa's claim obviously does not arise out of nor is attributable to the interpretation of the Purchase Order. Alcoa is not asking the arbitrators to interpret any language in the Purchase Order. Alcoa seeks an award of damages.

140. Alcoa's claim also does not arise out of Silec's performance of the Purchase Order.

141. The Purchase Order makes clear that the remedy for failure to perform is to obtain replacement parts – either by having the Seller correct the nonconformity or by allowing the Buyer to cover by purchasing substitute products. (See Purchase Order Section 4A, Art. 9.)

142. That is not what Alcoa seeks in its Arbitration Demand. Rather, Alcoa seeks recovery of damages resulting from an explosion and fire that occurred years after Silec's work on the project at issue was completed and which have nothing to do with the interpretation or performance of the Purchase Order.

143. Alcoa invokes performance of the Purchase Order's warranty provision as the basis of its arbitration. However, Alcoa seeks damages that are expressly outside the Warranty (and the Purchase Order).

144. Alcoa itself acknowledged this reality when it noted that "we doubt the parties intend the [Dispute Resolution] provision to apply to this type of dispute." (See Ex. D at p. 1.)

145. Alcoa's claim is about seeking damages expressly excluded by the Purchase Order and remedies beyond the Purchase Order's Warranty. Therefore, the triggering language of the arbitration clause is not satisfied to bring the claim within the arbitration clause, making the claim non-arbitrable.

C. Alcoa's Claim Is Not Arbitrable Because Alcoa Impermissibly Seeks Arbitration Of Damages That Are Not Available Under The Purchase Order, And Thus Not Subject To Any Arbitration Provision

146. In addition to asserting claims potentially based on the Services Contract which are not arbitrable, Alcoa also seeks recovery of damages that are not allowable under the Purchase Order and thus which also are not subject to any arbitration provision.

147. As noted above, the Purchase Order contains a damage provision which released and precludes recovery of consequential damages.

148. Alcoa's Arbitration Demand, however, seeks recovery of such damages.

149. Alcoa seeks to hold Silec liable for "all damages" resulting from the explosion and fire, "including approximately \$18.6 million in direct and incidental damages." (See Arbitration Demand (Ex. A hereto) at ¶¶ 14, 45.) Alcoa also seeks damage for business loss and interruption. (Id., ¶ 28.) It also seeks legal fees. (Id., ¶¶ 16, 45.)

150. These damages consist of consequential damages, which therefore fall outside the Purchase Order.

151. Since such damages are not recoverable under the Purchase Order, Alcoa's demand for such damages cannot be made pursuant to the Purchase Order and thus is not arbitrable.

D. Alcoa's Claim Is Not Arbitrable Because Alcoa Has Failed To Prove Any Binding Agreement To Arbitrate Exists

152. The jurisdiction and authority of an arbitrator derives from a contract; therefore, a valid contract agreement must exist between the parties before the parties may be subject to arbitration. See, e.g., City of Scranton v. Heffler, Radetich & Saitta, LLP, 871 A.2d 875, 879-80 (Pa. Commw. Ct. 2005), appeal denied, 587 Pa. 708, 897 A.2d 1184 (2006) ("A court must first

determine whether a valid agreement exists and then it must determine whether the dispute is within the scope of that agreement.”).⁸

153. Alcoa’s Arbitration Demand fails to satisfy this threshold.

154. The Services Contract expressly supersedes any and all other agreements entered into between the parties, providing that “This contract embodies the entire agreement between OWNER and CONTRACTOR and supersedes all other writings.” (See Ex. B, Schedule, Item 4.)

155. As such, the Services Contract supersedes the arbitration provision in the Purchase Order.

156. Since there is no arbitration provision in the Services Contract, there is no agreement to arbitrate the present dispute.⁹

157. Accordingly, for the reasons set forth herein, entry of injunctive relief is both necessary and appropriate.

WHEREFORE, Silec respectfully requests that the Court:

- A. Stay the Pennsylvania Arbitration and enjoin Alcoa and its counsel from taking any action or making any further submissions in connection with the Pennsylvania Arbitration;
- B. Enter a preliminary and permanent injunction enjoining Alcoa and its counsel from continuing with the Pennsylvania Arbitration;

⁸ Furthermore, because arbitration clauses abrogate a party’s right to litigate in court, under Pennsylvania law, arbitration clauses must be read strictly. See, e.g., Elwyn v. DeLuca, 2012 PA Super 136, 48 A.3d 457 (2012) (“Even though it is now the policy of the law to favor settlement of disputes by arbitration and to promote the swift and orderly disposition of claims, arbitration agreements are to be strictly construed and such agreements should not be extended by implication.”).

⁹ Further, Alcoa has not produced a signed agreement to arbitrate. Alcoa has not attached or otherwise provided a copy of the Purchase Order signed by Silec. The Purchase Order attached to Alcoa’s Arbitration Demand was entered into by Sagem, a separate party in this matter. (Arbitration Demand, C1.0001.) Under Pennsylvania law, Alcoa must produce evidence of a valid contract, or the arbitration may not proceed.

- C. Declare that the claim set forth by Alcoa in the Pennsylvania Arbitration is not arbitrable and that Silec is thus not obligated to participate in the Pennsylvania Arbitration or any other arbitration concerning such claims; and
- D. Grant Silec such other and further relief as may be necessary and appropriate under the circumstances, including to the extent awardable under applicable law, attorneys fees and costs.

COUNT II – FOR A DECLARATION OF NON-ARBITRABILITY

- 158. Silec restates the allegations set forth in paragraphs 1 through 157 of this Complaint and incorporates them by reference herein.
- 159. Silec is entitled to a judicial determination concerning the arbitrability of the claim asserted in the Pennsylvania Arbitration.
- 160. For the reasons set forth herein, an actual, justiciable controversy exists between the parties concerning the arbitrability of the claim asserted in the Pennsylvania Arbitration.
- 161. Alcoa has demanded arbitration of Alcoa's claim involving the Plant.
- 162. However, as set forth above, Silec is not required to arbitrate Alcoa's claim.
- 163. As detailed above and in Silec's Petition for Stay and/or Preliminary Injunction, Alcoa's claim is not subject to arbitration and should not be arbitrated because, *inter alia*:

(1) Alcoa's claim against Silec is not one related to, and certainly is not one limited solely to, the Purchase Order that contains the arbitration provision at issue; rather Alcoa's claim, if anything, concerns a separate Services Contract that does not contain any arbitration provision; however, Alcoa's Arbitration Demand is not based on, nor even attaches, the Services Contract – for obvious reasons. The Services Contract does not have an arbitration clause. The Services Contract limits liability of Silec for incidental, indirect, or consequential damages, as well as contains a Liability Cap that further caps potential liability so as not to exceed 10% of the amount paid to Silec by Alcoa under the agreement. Thus, for purposes of this dispute, the effective cap is approximately \$60,000, a sum significantly less than the \$18 million currently sought by Alcoa;

(2) Alcoa's Arbitration Demand seeks damages that are not permitted, and are expressly limited by, the Purchase Order pursuant to which Alcoa seeks to arbitrate this dispute;

(3) Even if Alcoa's claim were limited to and did fall under the Purchase Order (which Silec denies), Alcoa's claim still is not arbitrable because Alcoa's claim does not arise out of nor is attributable to the "interpretation or performance of" the Purchase Order; rather, Alcoa's claim arises out of an explosion and that occurred years after Silec's work on the project at issue was completed and has nothing to do with the interpretation or performance of the Purchase Order; and

(4) Alcoa has not proven there is a binding agreement to arbitrate its damage claims where the Purchase Order (and its arbitration provision) were later superseded by the subsequent Services Contract with Silec, to the extent that Alcoa failed to comply with the prerequisites to the arbitration provision, and where Alcoa has failed to provide a fully-executed copy of any arbitration agreement.

WHEREFORE, Silec respectfully requests that the Court:

- A. Stay the Pennsylvania Arbitration and enjoin Alcoa and its counsel from taking any action or making any further submissions in connection with the Pennsylvania Arbitration;
- B. Enter a preliminary and permanent injunction enjoining Alcoa and its counsel from continuing with the Pennsylvania Arbitration;
- C. Declare that the claim set forth by Alcoa in the Pennsylvania Arbitration is not arbitrable and that Silec is thus not obligated to participate in the Pennsylvania Arbitration or any other arbitration concerning such claims; and
- D. Grant Silec such other and further relief as may be necessary and appropriate under the circumstances, including to the extent awardable under applicable law, attorneys fees and costs.

COUNT III – FOR A DECLARATION OF NON-LIABILITY

164. Silec restates the allegations set forth in paragraphs 1 through 163 of this Complaint and incorporates them by reference herein.

165. Silec is entitled to a judicial determination concerning its rights and obligations under, and the various damage and other limitations in, the Purchase Order and the Services Contract as well as concerning Silec's liability, if any, for the fire and/or the claim asserted in the Pennsylvania Arbitration.

166. For the reasons set forth herein, an actual, justiciable controversy exists between the parties concerning Silec's liability, if any, for the fire and/or claim asserted in the Pennsylvania Arbitration, as well as concerning the applicability of the various provisions and limitations of the Purchase Order and Services Contract.

167. Silec has no liability for any injuries and/or damages arising out of the fire at the Plant or for the claim asserted in the Pennsylvania Arbitration.

168. Silec did not cause the fire at the Plant.

169. Silec did not contribute to the cause of the fire at the Plant.

170. Any injuries or damages claimed by Alcoa arose out of the acts, errors, or omissions of others, for which Silec is not responsible or liable.

171. If Silec does have any liability for the injuries or damages at the Plant (which is denied), any such liability is capped, limited or reduced by the terms, limitations or conditions of the Purchase Order and/or Services Contract.

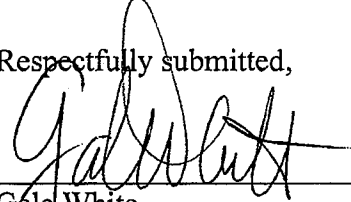
172. If, as one of Alcoa's repots (KEMA) has suggested, what caused the fire was cracking of the epoxy insulator at one of the cable terminations, and if, as KEMA also posits, that cracking occurred prior to commissioning (for instance during transportation or installation), then any such cracking of the epoxy insulator would have and should have been seen by Fuji and/or Alcoa in the three years between the time of commissioning and the date of the fire – such as during one of Fuji's repeated interventions.

173. Silec is not liable for any damages caused by Fuji and/or Alcoa or which Fuji and/or Alcoa failed to prevent or mitigate.

WHEREFORE, Silec respectfully requests that the Court:

- A. Declare that Silec has no liability to Alcoa for the claim set forth by Alcoa in the Pennsylvania Arbitration or any similar claim asserted by Alcoa;
- B. Declare that Silec did not cause or contribute to the cause of the fire at the Plant and has no liability for any injuries or damages which resulted from the fire;
- C. Declare that, *if* Silec did cause or contribute to the cause of the fire at the Plant (which is specifically denied by Silec) and *if* Silec has any liability for any injuries or damages which resulted from the fire, then any damages recoverable from Silec are limited by the terms and conditions of the relevant contract(s) and declare the extent of those limitations;
- D. Declare that, *if* Silec did cause or contributed to the cause of the fire at the Plant (which is specifically denied by Silec) and *if* Silec has any liability for any injuries or damages which resulted from the fire, then Silec's liability is limited by the actions, errors, omissions, negligence or contributory negligence of others in causing or contributing to the cause of the fire; and
- E. Grant Silec such other and further relief as may be necessary and appropriate under the circumstances, including to the extent awardable under applicable law, attorneys fees and costs.

Respectfully submitted,



Gale White
Anthony L. Miscioscia

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Attorneys for Silec Cable

Dated: September 7, 2012

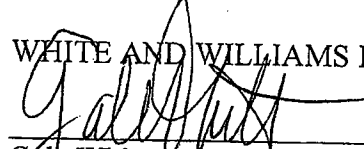
IN THE COURT OF COMMON PLEAS OF ALLEGHENY COUNTY, PENNSYLVANIA

SILEC CABLE S.A.S.,	:	CIVIL DIVISION
	:	
Plaintiff	:	CASE No. _____
	:	
vs.	:	Code: 180 – Declaratory Judgment
	:	
ALCOA FJARDAAL SF	:	
	:	DEMAND FOR JURY TRIAL
	:	
Defendant.	:	<u>Filed on behalf of:</u>
	:	Plaintiff, Silec Cable
	:	
	:	<u>Counsel for Plaintiff:</u>
	:	Gale White (I.D. # 46485)
	:	Anthony L. Miscioscia (I.D. # 69215)
	:	Joshua A. Mooney (I.D. # 85945)
	:	WHITE AND WILLIAMS LLP
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	:	<u>whiteg@whiteandwilliams.com</u>
	:	<u>misciosciaa@whiteandwilliams.com</u>
	:	<u>mooneyj@whiteandwilliams.com</u>

DEMAND FOR TRIAL BY JURY

Plaintiff hereby demands a trial by jury of issues so triable.

WHITE AND WILLIAMS LLP


Gale White

Anthony L. Miscioscia

Joshua A. Mooney

Attorneys for Silec Cable

Dated: September 7, 2012

VERIFICATION

I, Emmanuel David, verify that I am a representative of the plaintiff in the foregoing matter and further verify that the facts set forth in the foregoing Complaint are true and correct to the best of my knowledge, information, and belief. This Verification is made subject to the penalties of 18 Pa. C.S.A. § 4904 relating to unsworn falsification to authorities.

Date: September 07, 2012

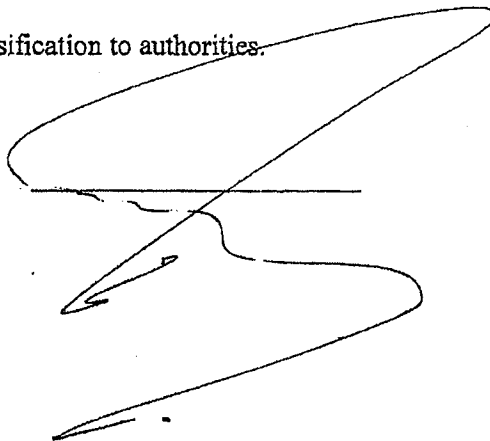
A handwritten signature in black ink, appearing to be 'Emmanuel David', written over a horizontal line.

EXHIBIT A

IN AN ARBITRATION PURSUANT TO THE RULES
OF THE
INTERNATIONAL CHAMBER OF COMMERCE

NO:

BETWEEN:

ALCOA FJARÐAÁL SF (Iceland)

Claimant

- and -

(1) SILEC CABLE (France)
(2) SAGEM SA (France)

Respondents

REQUEST FOR ARBITRATION

31 July 2012

K&L Gates LLP
K&L Gates Center
210 Sixth Avenue
Pittsburgh, Pennsylvania 15222-2613
United States of America

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I. PARTIES

1. Claimant Alcoa Fjarðaál Sf (“**Claimant**”) is organized and existing under the laws of the Iceland.
2. **Claimant’s** address is:

Hraun 1
Reyðarfjörður
730 Iceland
3. Respondent Silec Cable is a company organized and existing under the laws of France.
4. Respondent Silec Cable’s address is:

Silec Cable
Rue de Varennes Prolongée
Montereaup, France
77876 Cedex
5. Respondent SAGEM SA is a company organized and existing under the laws of France.
6. Respondent SAGEM SA’s address is:

SAGEM SA
55 bld Charles de Gaulle
Malakoff, Paris- 94250
France
7. Respondent Silec Cable and Respondent SAGEM SA are collectively referred to herein as “**Respondents.**”
8. Respondent SAGEM SA was initially listed as the supplier on the Purchase Order which is the subject of this arbitration, and Respondent Silec Cable later replaced Respondent SAGEM SA as the named supplier on that Purchase Order pursuant to certain amendments subsequently agreed between the parties.
9. At all times and for all purposes relevant to this arbitration, Respondent SAGEM SA was controlled by Respondent Silec Cable. Therefore, **Claimant** herein attributes the actions, inactions, representations, misrepresentations and knowledge of one Respondent to also be the actions, inactions, representations, misrepresentations and knowledge of the other Respondent.

II. CLAIMANT'S LEGAL REPRESENTATIVES

10. **Claimant** is represented in this arbitration by Thomas E. Birsic and John P. Estep of K&L Gates LLP. All communications for the purposes of the arbitration should be addressed to

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United States of America

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E-mail: john.estep@klgates.com

The Power of Attorney granted by **Claimant** to the above counsel will be provided upon request.

11. For convenience, all documents referenced by Claimant as exhibits to this Request are contained in the accompanying bundle and identified by the sequence: **Exhibit C1.0001, Exhibit C1.0002; Exhibit C2.0001, C2.0002, etc.**

III. THE NATURE AND CIRCUMSTANCES OF THE DISPUTE AND THE BASIS OF THE CLAIM

1. Executive Summary

12. On or about 16 December 2005, **Claimant**, through its disclosed agent, Bechtel Overseas Corporation, entered into a Purchase Order with **Respondents** whereby **Respondents** agreed to, among other things, provide **Claimant** with certain permanent cable termination equipment to be used as components in rectifier regulating transformers located at **Claimant's** aluminum smelter facility near Reyðarfjörður, Iceland (the "**Purchase Order**") [**Exhibit C1, Purchase Order**]. **Respondents** warranted in the **Purchase Order** that all products provided pursuant to the **Purchase Order** would be, among other things, "free from . . . defects in design, material, workmanship, and title" [**Exhibit C1.0010**].
13. The present dispute arises out of a 18 December 2010 explosion and subsequent fire at **Claimant's** smelter facility. As set forth in more detail below and as will be proven in this arbitration, the explosion and fire resulted from electrical arcing that occurred inside a transformer at the facility. The electrical arcing was caused by a latently defective cable termination assembly that had been provided to **Claimant** by **Respondents** in breach of the warranty set forth in the **Purchase Order**.
14. As a result of the explosion and fire flowing from **Respondents'** breach of warranty, **Claimant** has incurred significant damages, including approximately \$18.6 million in direct and incidental damages.
15. To date, **Respondents** have repeatedly refused to accept any responsibility for the explosion and subsequent fire or for **Claimant's** resulting damages.
16. As explained in more detail below, **Claimant** seeks an Award finding that **Respondents'** actions in providing **Claimant** with a defective cable termination assembly constituted a breach of **Respondents'** warranty. In addition, **Claimant** seeks damages in the amount of at least US \$18,641,035.96, pre-award and post-award interest at a rate to be determined at a later time, an order requiring **Respondents** to reimburse **Claimant** for **Claimant's** legal costs and the costs of the arbitration, and such other relief as the Arbitral Tribunal deems just in respect of the matters set out in this Request.

2. Respondents' Agreement to Provide Claimant with Cable Termination Equipment

17. In 2004, after approval by the Icelandic Government, **Claimant** commenced construction of a greenfield aluminum smelter facility near Reyðarfjörður, Iceland, known as the Fjarðaál project (the "**Smelter Facility**"). The **Smelter Facility** was completed and became fully operational in 2007, with the capacity to produce 346,000 metric tons of aluminum per year.
18. The power system at the **Smelter Facility** is regulated by five, three-phase rectifier regulating transformers (identified as RF-11, RF-12, RF-13, RF-14, and RF-15), which are located in an electrical substation. Each phase of the transformers contains a cable junction box which houses a cable termination assembly. The transformers and cable junction boxes—but not the cable

termination assemblies—were manufactured by Fuji Electric Corporation (“Fuji”) in Japan in 2005 and installed by Fuji at the Smelter Facility in 2007.

19. On or about 16 December 2005, Claimant, through its disclosed agent Bechtel Overseas Corporation (“Bechtel”), and Respondents entered into a Purchase Order whereby Respondents agreed to, among other things, provide Claimant with certain permanent cable termination equipment [Exhibit C1].¹ Of particular relevance to the present dispute, Respondents agreed to design and manufacture fifteen (15) separate cable termination assemblies, which Respondents would then install one-by-one inside the cable junction boxes in each phase of the Fuji-manufactured transformers.
20. Pursuant to the Purchase Order, Respondents completed installation of the fifteen (15) cable terminations in 2007.
21. Claimant has at all times complied with its obligations under the Purchase Order, including, without limitation, the obligation to remit a purchase fee to Respondents in exchange for the Respondents’ provision of products and services.

3. Respondents’ Warranty and Other Key Purchase Order Provisions

22. In Article 9 of Section 4A General Conditions of the Purchase Order, Respondents provided an express warranty with respect to the “PRODUCTS” provided under the Purchase Order (the “Warranty”). The Warranty provides in pertinent part:

SELLER warrants that the PRODUCTS shall be free from liens and from defects in design, material, workmanship, and title, and shall conform in all respects to the terms of this AGREEMENT and to the applicable drawings issued for manufacture, and shall be new and of the best quality, if no quality is specified. Unless the warranty period is otherwise specified in this AGREEMENT, the following warranty shall apply: if, any time prior to one (1) year from the date of Ready for First Hot Metal at OWNER’S facility, or, with respect to liens, title or latent defects at any time, it appears that the PRODUCTS, or any part thereof, do not conform to these warranties . . .

[Exhibit C1.0010].

23. The Warranty further provides:

¹ In or around September 2006, Claimant and Respondent Silec Cable also entered into a Construction Services Order whereby Respondent Silec Cable agreed to provide certain services related to the installation of cable termination equipment at the Smelter Facility (the “Services Agreement”). While the Services Agreement purports to govern the provision of certain services by Respondent Silec Cable, the Services Agreement expressly excludes from its scope the “[p]rovision of permanent material” and states that “[a]ll permanent material is addressed under separate Purchase Order which carry their own terms and conditions.” The terminations provided by Respondents were unquestionably “permanent material.” Consequently, the Purchase Order—not the Services Agreement—governs the present dispute.

SELLER'S liability hereunder shall extend to all damages proximately caused by the breach of any of the foregoing warranties, including incidental damages, such as disassembly, removal, inspection, re-installation, re-testing, costs of transportation or warehousing.

[Exhibit C1.0010].

24. Article 1 of Section 4B Special Conditions of the **Purchase Order** broadly defines "PRODUCT" as "the goods, materials, articles, equipment, supplies, drawings, data, processes and all other property and services, including design, expediting, inspection, delivery, installation, and testing, specified or required to furnish the items ordered hereunder" [Exhibit C1.0014]. Consequently, all equipment provided by **Respondents** pursuant to the **Purchase Order**, including the cable termination assemblies, is subject to the **Warranty**.
25. As stated above, **Bechtel**, as **Claimant's** agent, entered into the **Purchase Order** with **Respondents**. In that regard, Article 1 of Section 4B Special Conditions of the **Purchase Order** states that "[t]o the extent that [Bechtel] is not the ultimate consumer of the PRODUCTS being herein purchased, all rights, benefits and remedies conferred upon [Bechtel] by this AGREEMENT shall also accrue and be available to and are for the express benefit of OWNER for which the PRODUCTS are purchased" [Exhibit C1.0014].
26. Article 1 of Section 4B Special Conditions of the **Purchase Order** defines "OWNER" as "Fjarðaál sf. and its authorized representatives, affiliates, partners, shareholders and successors in interest." [Exhibit C1.0014].

4. The Fire and Respondents' Breach of Warranty

27. On 18 December 2010 at approximately 5 p.m. local time, an explosion occurred in the electrical substation at the **Smelter Facility**, resulting in a significant fire. The fire burned until approximately 9:30 p.m. local time when **Claimant's** employees and local firefighters managed to extinguish the blaze.
28. Although no persons were injured by the fire and explosion (together the "**Fire**"), the **Fire** caused substantial and widespread damage to the physical structures in and around the electrical substation and forced **Claimant** to reduce aluminum production for a period of time following the **Fire**.
29. In or around January 2011, **Claimant** engaged Kevin Kennedy Associates ("**Kennedy**"), a U.S.-based failure analysis consultant, to conduct a complete and independent investigation of the root cause of the **Fire**.
30. As part of that engagement, **Kennedy** travelled to the **Smelter Facility** to assess the **Fire** scene and to collect and analyze artifacts that had survived the **Fire**. In addition to the artifact inspection, **Kennedy** undertook a detailed analysis of Dissolved Gas Analysis data collected from cable junction boxes from all five rectifier regulating transformers housed in the electrical substation.

31. On or about 4 March 2011, **Kennedy** issued a report in which it arrived at two basic conclusions as to the root cause of the **Fire**:
- (i) **Kennedy** determined that the **Fire** had originated in the W-phase cable junction box located in transformer RF-12; and
 - (ii) **Kennedy** concluded that the **Fire** was caused by electrical arcing originating from a failure of electrical insulation within the W-phase cable termination assembly in RF-12 (the "**Defective Assembly**").

[**Exhibit C2.0002-0007, 4 March 2011 Kennedy Report**].

32. According to **Kennedy's** 4 March 2011 report, the conclusion that electrical arcing originated in the **Defective Assembly** was supported by, among other things, a specific arc pattern observed on the copper conductor, the presence and severity of carbon tracking on the internal surfaces of the termination's insulator shell, and evidence showing that the W-phase cable was forced downward during the arcing event [**Exhibit C2.0002-0004**].
33. Since **Respondents** had designed, manufactured, and installed the **Defective Assembly**, **Claimant** shared the findings of **Kennedy's** 4 March 2011 report with **Respondents** and informed the **Respondents** that **Claimant** believed **Respondents** to be solely and completely responsible for the **Fire** and resulting damages.
34. **Respondents** refused to accept liability and expressed a desire to have a second independent company investigate the cause of the **Fire**. Following discussions between **Claimant** and **Respondents**, it was suggested that **KEMA** ("**KEMA**"), a Netherlands-based energy consulting firm, be retained to perform that analysis. **Respondents** agreed and **Claimant** engaged **KEMA** in or around April 2011 to perform additional analysis of the root cause of the **Fire**.
35. On or about 28 April 2011, **KEMA** travelled to the **Smelter Facility** to view and analyze the relevant cable junction box and transformer parts that had survived the **Fire**. **Respondents** and **Respondents' insurer**, along with representatives of **Claimant** and **Fuji**, attended **KEMA's** artifact inspection on 28 April 2011 and 29 April 2011. As part of its investigation, **KEMA** also analyzed Dissolved Gas Analysis data that had been collected from the transformer cable junction boxes.
36. On or about 17 May 2011, **KEMA** issued a report regarding the root cause of the **Fire**. Like **Kennedy**, **KEMA** concluded that the **Fire** was caused by electrical arcing that first occurred in the **Defective Assembly**. Also like **Kennedy**, **KEMA** concluded that the electrical arcing was caused by a crack in the **Defective Assembly's** epoxy resin insulator [**Exhibit C3.0005; C3.0012-0019, KEMA Report**].
37. **KEMA** additionally found that, based on a detailed analysis of the Dissolved Gas Analysis data, the crack in the insulation was in existence at the time the **Smelter Facility** transformers underwent standard commissioning in 2007 [**Exhibit C3.0005; C3.0015-0019**].
38. On or about 20 May 2011, **Kennedy** issued a follow-up report in which it also concluded, based on an analysis of the Dissolved Gas Analysis data, that the crack in the **Defective Assembly's**

insulation was present at the time of commissioning in 2007 [Exhibit C4.0003-0010, 20 May 2011 Kennedy Report].

39. **Claimant** has provided the 17 May 2011 **KEMA** report, as well as the 20 May 2011 and 4 March 2011 **Kennedy** reports, to the **Respondents**.
40. Despite the fact that the **Kennedy** and **KEMA** reports unequivocally support the conclusion that **Respondents** provided **Claimant** with a defective termination assembly which caused the **Fire**, **Respondents** continue to deny any and all liability.
41. Notwithstanding **Respondents'** unfounded denials, and as will be proven in this arbitration, the evidence supports the following inescapable conclusions:
 - (i) Pursuant to the **Purchase Order**, **Respondents** designed, manufactured, and installed the **Defective Assembly**;
 - (ii) All of the cable termination equipment provided by **Respondents** to **Claimant**, including the **Defective Assembly**, was provided subject to the **Warranty** contained in the **Purchase Order**;
 - (iii) As provided by **Respondents**, the **Defective Assembly** contained a latent defect in the form of a crack in the assembly's insulation that could not have been reasonably discovered by **Claimant** prior to the **Fire**;
 - (iv) By providing **Claimant** with a latently defective cable termination assembly, **Respondents** breached the **Warranty**;
 - (v) **Respondents'** breach of the **Warranty** caused the **Defective Assembly** to fail and resulted in the subsequent **Fire**; and
 - (vi) Pursuant to the express provisions of the **Purchase Order**, **Respondents** are liable to **Claimant** for any and all damages proximately caused by **Respondents'** breach of the **Warranty**.

5. Claimant's Damages

42. As a consequence of **Respondents'** breach of the **Warranty**, **Claimant** has been required to, among other things, inspect, disassemble, remove, re-install, repair, transport, store, and replace certain pieces of equipment and property damaged by the **Fire**.
43. As expressly stated in Article 9 of Section 4A General Conditions of the **Purchase Order**, the types of damages listed above are considered to be "proximately caused" by **Respondents'** breach of the **Warranty** and, therefore, **Respondents** are 100% liable for those damages [Exhibit C1.0010].
44. To date, **Claimant** has incurred at least US \$18,641,035.96 in damages proximately caused by **Respondents'** breach of the **Warranty**, for which **Respondents** are solely and completely liable.

IV. RELIEF REQUESTED

45. The **Claimant** requests that the Arbitral Tribunal to be constituted in this case issue a final award:
- (a) Declaring that **Respondents'** actions in providing **Claimant** with a defective cable termination constituted a breach of the **Warranty** under Pennsylvania law;
 - (b) Ordering **Respondents** to pay to **Claimant** all damages proximately caused by **Respondents'** breach of the **Warranty**, in an amount of at least US \$18,641,035.96;
 - (c) Ordering **Respondents** to pay pre-award and post-award interest at a rate to be determined at a later time;
 - (d) Ordering **Respondents** to reimburse **Claimant** for **Claimant's** legal costs, fees, and expenses and the costs of the arbitration, including the fees and expenses of the Tribunal and of the **ICC**; and
 - (e) Ordering such other relief as to the Tribunal appears just.
 - (f) **Claimant** reserves the right to amend or supplement this request for relief in due course.

V. AGREEMENT TO ARBITRATE

46. Article 9 of Section 4B Special Conditions of the Purchase Order provides for ICC arbitration with a seat in Pittsburgh, Pennsylvania, USA before a Tribunal of three arbitrators. The provision provides:

Any claim arising out of or attributable to the interpretation or performance of this AGREEMENT, which cannot be resolved by negotiation shall be considered a dispute within the meaning of this clause. [emphasis added]

If for any reason BUYER and SELLER are unable to resolve a claim for an adjustment, BUYER or SELLER shall notify the other party in writing that a dispute exists and request or provide a final determination by BUYER. Any such request by SELLER shall be clearly identified by reference to this clause and shall summarize the facts in dispute and SELLER's proposal for resolution.

BUYER shall, within ten (10) calendar days of any request by SELLER, provide a written final determination setting forth the contractual basis for its decision and defining what adjustments it considers equitable. Upon SELLER'S written acceptance of BUYER'S determination the AGREEMENT will be modified and the determination implemented accordingly or, failing agreement, BUYER may in its sole discretion pay such amounts and/or revise the time for performance of the work in accordance with BUYER'S final determination.

If BUYER'S final determination is not accepted by SELLER, the matter shall, be referred to senior executives of the parties who shall have designated authority to settle the dispute. If the dispute remains unresolved, the Parties agree that the dispute shall be referred to mediation by a mediator agreed by the Parties with the mediation to be conducted as agreed between the Parties ("Mediation"). The Mediation shall last no more than three (3) calendar days unless the Parties agree to an extension of time. The costs of the Mediation (including the Mediator's fees, mediation premises and other related costs) shall be borne equally by the Parties. The Parties agree to use their best endeavors and to negotiate in good faith to resolve any dispute at Mediation and will ensure that their respective representatives involved in any Mediation have full power and authority to settle the dispute.

If the dispute has not been resolved within seven (7) calendar days of the conclusion of the Mediation convened, the Parties agree that the dispute shall and is hereby referred to binding arbitration by three arbitrators. One each shall be selected by the Parties who shall endeavor to agree selection of the third failing, which the third shall be referred to and selected by the International Chamber of Commerce under ICC ("Arbitration"). The Arbitration shall be conducted in accordance with the rules of the ICC and shall be held in Pittsburgh, Pennsylvania and the decision of the Arbitration shall be final and conclusive save where ICC rules permit appeal therefrom. [emphasis added]

[Exhibit C1.0021].

47. Article 1 of Section 4B Special Conditions of the **Purchase Order** defines "Parties" as "SELLER, BUYER and/or OWNER collectively." As stated above, the same Article of the **Purchase Order** defines "OWNER" as "Fjarðaál sf. and its authorized representatives, affiliates, partners, shareholders and successors in interest" [**Exhibit C1.0014**].
48. To the extent that Article 9 of Section 4B Special Conditions of the **Purchase Order** requires the parties to engage in Mediation prior to commencement of ICC arbitration, in a 12 April 2012 letter from **Respondents'** legal representative to **Claimant's** agent, **Respondents** asserted that the **Purchase Order** did not apply to the present facts and thereby waived any such mediation requirement [**Exhibit C5, 12 April 2012 Letter**].
49. Article 6 of the **Rules** provides that the parties "shall be deemed to have submitted *ipso facto* to the Rules in effect on the date of commencement of the arbitration unless they have agreed to submit to the Rules in effect on the date of their arbitration agreement." Since the parties did not agree in the **Purchase Order** to submit to the ICC Rules in effect on the date of their arbitration agreement, the ICC Arbitration Rules in force as from 1 January 2012 should apply.

VI. NUMBER AND CHOICE OF ARBITRATORS

50. With respect to the number of arbitrators, the **Purchase Order** provides for three (3) arbitrators, with each party to select one arbitrator and the Chairman to be selected by the co-arbitrators. If the co-arbitrators fail to agree upon a Chairman, the Chairman shall be selected by the ICC. In that regard, Article 9 of Section 4B Special Conditions of the **Purchase Order** states in relevant part:

. . . the Parties agree that the dispute shall and is hereby referred to binding arbitration by three arbitrators. One each shall be selected by the Parties who shall endeavor to agree selection of the third failing, which the third shall be referred to and selected by the International Chamber of Commerce under ICC . .

[Exhibit C1.0021].

51. Pursuant to Article 12(4) of the ICC Rules, **Claimant** hereby nominates Professor William W. Park for confirmation. Professor Park's contact information is as follows:

William W. Park
Boston University Law Faculty
765 Commonwealth Avenue
Boston, Massachusetts 02215
United States of America

Tel: +1.617.353.3149
Fax: +1.617.353.3077
E-mail: wwpark@bu.edu

**VII. APPLICABLE RULES OF LAW AND THE PLACE
AND LANGUAGE OF THE ARBITRATION**

52. Article 17 of Section 4A General Conditions of the **Purchase Order** provides that the “definition of terms used, interpretation of this AGREEMENT and rights of the parties hereunder shall be construed under and governed by the laws of the jurisdiction of the State of Pennsylvania, USA” **[Exhibit C1.0013]**.
53. Article 9 of Section 4B Special Conditions of the **Purchase Order** provides that the place of arbitration shall be Pittsburgh, Pennsylvania, USA **[Exhibit C1.0021]**.
54. Article 9 of Section 4B Special Conditions of the **Purchase Order** does not specify the language of the arbitration **[Exhibit C1.0021]**. Consequently, **Claimant** respectfully requests that, pursuant to Article 20 of the **Rules**, the Arbitral Tribunal to be constituted in this case select English as the language of arbitration, in light of the fact that the language of the **Purchase Order** is English, most (if not all) necessary witnesses speak English, and the **Purchase Order** is governed by the laws of the Commonwealth of Pennsylvania, USA.

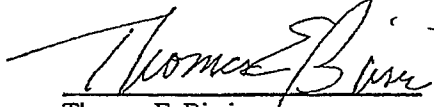
VIII. RESERVATION OF RIGHTS

55. **Claimant** expressly reserves the right to submit such supplemental or additional claims, arguments, documentation, proof of damage, or other evidence in this arbitration as it may in its judgment deem appropriate, or may be required to respond to any claim or defense which may be advanced by the **Respondents**.

IX. PAYMENT OF REGISTRATION FEE

56. In accordance with Article 3 of the Rules, the Claimant has submitted seven (7) copies of this Request for Arbitration to the Secretariat of the ICC, together with proof of wire transfer of the filing fee required under Appendix III to the Rules in the amount of US \$3,000.

Respectfully submitted on behalf of the Claimant by

A handwritten signature in cursive script, appearing to read "Thomas E. Birsic".

Thomas E. Birsic
John P. Estep

K&L Gates LLP

IN AN ARBITRATION PURSUANT TO THE RULES
OF THE
INTERNATIONAL CHAMBER OF COMMERCE

NO:

BETWEEN:

ALCOA FJARÐAÁL SF (Iceland)

Claimant

-and-

(1) SILEC CABLE (France)

(2) SAGEM SA (France)

Respondents

**CLAIMANT'S EXHIBITS TO THE REQUEST
FOR ARBITRATION
EXHIBITS C1 – C5**

K&L Gates LLP
K&L Gates Center
210 Sixth Avenue
Pittsburgh, Pennsylvania 15222-2613
United States of America

CLAIMANT'S EXHIBITS TO THE REQUEST FOR ARBITRATION**INDEX OF EXHIBITS**

EXHIBIT NUMBER	DOCUMENT	DATE
C1	Purchase Order between Claimant and Respondents	16 December 2005
C2	Report of Kevin Kennedy Associates: <i>Professional Engineering Report, RF12 Rectifier Electrical Fault and Fire, Alcoa Fjarðaál, Reyðarfjörður, Iceland</i>	4 March 2011
C3	Report of KEMA: <i>Root Cause of the Breakdown in the Alcoa Fjarðaál Network on December 18, 2010 of a 220 kV Regulating Transformer RF12 of Fuji with a 220 kV XLPE Cable Connection of Silec</i>	17 May 2011
C4	Report of Kevin Kennedy Associates: <i>Professional Engineering Report No. 2, RF12 Rectifier Electrical Fault and Fire, Alcoa Fjarðaál, Reyðarfjörður, Iceland</i>	20 May 2011
C5	Letter from Respondents to Claimant	12 April 2012

EXHIBIT C1

REQUEST FOR ARBITRATION

Fjarðaal sf

PURCHASE ORDER

Fjarðaal Smelter Project



Fjarðaal sf

Bechtel Overseas Corporation as Agent,
c/o Bechtel Quebec Limitee
Fjarðaal Smelter Project
1500 University Street, Suite 400
Montreal, Quebec
Canada – H3A 3S7

TO: SAGEM SA

55 bld Charles de Gaulle
Malakoff, PARIS- 94250
France

Attention: Hamid-Reza Hakimi-Tabrizi
Telephone No: +33 1 53 23 71 84
Fax No: +33 1 53 23 73 91
Email: hamid-reza.hakimi-tabrizi@sagem.com

PURCHASE ORDER NUMBER:

24956-310-POA-EWG0-00001 Rev. 0

AWARD DATE: December 15, 2005

ISSUE DATE: December 16, 2005

Requisition No.: 24956-310-MRA-EWG0-00001 Rev. 0

PROMISED SHIP DATE:

May 28, 2006

TOTAL PURCHASE VALUE:

Euro Currency Unit

1,258,560.60 EUR

All prices shown herein are firm unless stated
otherwise in Section 1 - Scope of Work, Pricing, and
Notes.

Product: 220 kV cables with terminations

PURCHASE ORDER ATTACHMENTS:

- Section 1 Scope of Work, Pricing, and Notes
- Section 2 Technical Specifications
- Section 3 Drawing and Data Requirements
- Section 4A General Conditions
- Section 4B Special Conditions
- Section 5 Supplier Quality Surveillance
- Section 6 Expediting Instructions
- Section 7 Shipping and Packing Instructions
- Section 8 Invoicing Instructions

Payment Terms: (See Section 1 - Commercial Notes)
Shipping Terms: (See Section 1 - Commercial Notes)
Origin of shipment(s): (See Section 1 - Commercial Notes)
Shipper(s): (See Section 1 - Commercial Notes)

FOR BECHTEL USE ONLY:

Job Number: 24956.200
Cost Code: see Section 1
DUNS Number: 275374015
Commodity Code: EWG0
Commitment Register No.: 3140

CORRESPONDENCE: Send copies of all correspondence relating to this Purchase Order to the attention of the Buyer named below at the address shown above. Purchase Order, item, tag, and stock code numbers must be referenced on correspondence.

INSPECTION: Is Required(See Section 5 - Supplier Quality Surveillance)

Do not ship any products prior to release by Buyer's Supplier Quality Representative.

SHIP AND CONSIGN TO:(See Section 7 - Shipping Instructions)**INVOICING:**(See Section 8 - Invoicing Instructions)

PURCHASE ORDER - DO NOT DUPLICATE

BUYER'S AUTHORIZED REPRESENTATIVE

Bechtel Overseas Corporation as Agent

Signature: _____
By: Allan Stewart
Project Procurement Manager

Buyer: Manon Dussault
Title: Purchasing Agent
Telephone: 514-394-2898
Fax: 514-954-1185
Email: mdussault@bechtel.com

SELLER'S ACCEPTANCE

SELLER is required to acknowledge acceptance of this Purchase Order by returning a copy of this page signed by an authorized representative within one week after receipt of this order. The authorized representative of SELLER accepts and agrees to furnish the Goods and Services specified in full accordance with only those terms and conditions contained in this Purchase Order.

Signature: _____

Print Name: _____

Title: _____

Date: _____

SECTION 1 – SCOPE OF WORK, PRICING AND NOTESBechtel Overseas Corporation as Agent
Fjarðará Smelter ProjectPURCHASE ORDER
SCOPE OF WORK AND PRICING

Item	Rev	Quantity & Unit	DESCRIPTION	Unit Price	Extended Value
			Design, manufacture, factory testing and delivery of High Voltage Power Cables and Cable Terminations Equipment as specified in specification for E-Electrical 220 kV High Voltage Power Cables and 33 kV High Voltage Power Cables. Document no. 24956-000-3PS-EZL1-00001.		
			Furnish all labour, materials and services for the design, fabrication, testing and delivery of the Products specified in accordance with this Material Requisition and all attachments hereto, and any resultant Purchase Order and all attachments thereto. All Products shall be complete and operational when installed and tested in accordance with Seller's instructions and shall include all necessary accessories.		
			Seller supervision and testing according to QA plan.		
0.1	0	1 Lot	Drawings and Data in accordance with attached Material Requisition Scope of Supply - Section 1, Technical Specifications - Section 2 and Drawing and Data Requirement - Section 3.	Included	Included
0.2	0	1 Lot	Supplier Quality Surveillance as per attached Supplier Quality Surveillance - Section 5.	Included	Included
0.3	0	1 Lot	Expediting and scheduling reports in accordance with attached Expediting Requirements - Section 6.	Included	Included
0.4	0	1 Lot	Packing and Shipping in accordance with Packing and Shipping Instructions - Section 7.	Included	Included
0.5	0	1 Lot	Shipping and exporting / importing documentation in accordance with Invoicing Instructions - Section 8.	Included	Included
0.6	0	1 Lot	Storage, erection, operation, training and maintenance instructions / manuals in accordance with Material Requisition.	Included	Included
1	0	2,310.6 Meters	220 kV XLPE one core cable, 800 mm ² , Cu Project Stock Code EWTFDL000001 Cost Code: 0311.WG	133.00	307,309.80
			The cable shall be packaged on 3 non-returnable reels:		
			• Reel 1: 722.7m		
			• Reel 2: 814.8m		
			• Reel 3: 773.1m		
3	0	21 Each	220 kV termination kits for XLPE one core cable to SF6 GIS Project Stock Code EWWFDL000001 Cost Code: 0311.WT	7,500.00	157,500.00
4	0	21 Each	220 kV termination kits for XLPE one core cable to Oil filled terminal box... Project Stock Code EWWFDL000002 Cost Code: 0312.WT	8,200.00	172,200.00

PURCHASE ORDER NO: 24956-310-POA-EWG0-00001 Rev. 0

SECTION 1 – SCOPE OF WORK, PRICING AND NOTESBechtel Overseas Corporation as Agent
Fjarðaaí Smelter ProjectPURCHASE ORDER
SCOPE OF WORK AND PRICING

Item	Rev	Quantity & Unit	DESCRIPTION	Unit Price	Extended Value
6	0	7,772.4 Meters	33 kV XLPE one core cable, 800 mm ² , Cu. Project Stock Code EWTFDL000002 The cable shall be packaged on 7 non-returnable reels: <ul style="list-style-type: none"> • Reel 1: 932.4m • Reel 2: 1224.0m • Reel 3: 1255.2m • Reel 4: 1189.6m • Reel 5: 913.2m • Reel 6: 1002.8m • Reel 7: 1255.2m 	67.00	520,750.80
8	0	120 Each	33 kV termination kits for XLPE one core cable to air filled and open-air isolator on filter and terminal box for rectifier Project Stock Code EWWFDL000003 Cost Code: 0312.WT	840.00	100,800.00
10	0	1 Lot	Provision for on-site supervision by Seller Cost Code: 0311.WG	See Item 9 on page 5	See Item 9 on page 5
11	0	1 Lot	Testing equipment for termination Cost Code: 0311.WG	N/A	N/A
13	0	1 Lot	FAT Test	Included	Included
15	0	21 Each	Termination connectors to termination stud through corona shield (lugs for oil filled terminal box, rectifier and auxiliary transformer). Project Stock Code EWLFDL000010 Drawing No. BE PL 05512/1	Included	Included
16	0	126 Each	Clamp type SL for 220 kV cable. Project Stock Code EWLFDL000003	Included	Included
17	0	21 Each	One-phase earthing box with lighting arrester with counter (RNL HC), type b0 Project Stock Code EWLFDL000004 Drawing No. BE PL 03379-1	Included	Included
18	0	7 Each	Three phase Earthing box (without lighting arresters) Project Stock Code EWLFDL000005 Drawing No. ENG 20104-1	Included	Included
19	0	126 Each	Lighting arresters HC3 type Project Stock Code EWLFDL000006 Drawing No. ENG 20464-1	Included	Included
21	0	84 Each	Shock absorber support. Project Stock Code EWLFDL000008 Drawing No. ENG 00706-1	Included	Included
22	0	1 Each	Pulling eye Project Stock Code EWLFDL000009 Drawing No. ENG 20059-1	Included	Included

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SECTION 1 – SCOPE OF WORK, PRICING AND NOTESBechtel Overseas Corporation as Agent
Fjarðaál Smelter ProjectPURCHASE ORDER
SCOPE OF WORK AND PRICING

Item	Rev	Quantity & Unit	DESCRIPTION	Unit Price	Extended Value
23	0	120 Each	Connector (lugs) from termination to busbar or connection point Project Stock Code EWLFDL000011 Drawing No. ENG 21409-1	Included	Included
24	0	240 Each	Clamp type SL, for 33 kV cable. Project Stock Code EWLFDL000012	Included	Included
25	0	60 Each	Lighting arresters. HC type 5. Project Stock Code EWLFDL000013 Drawing No. ENG 20325-1	Included	Included
			Total Value Euro Currency Unit		1,258,560.60

1. PRICING POLICY

Prices are firm through delivery and not subject to adjustment or escalation.

2. PAYMENT TERMS

Progress Payments, Net in 30 days, based on the following payment schedule:

- 30% Payment on Approval of Critical Drawings (DDR N^{os} 1, 2, 3, 4, 13 and 14) and Performance Bank Guarantee for 10% PO Value valid through to 30 April 2008 or completion of Warranty, whichever is earlier.
- 70% Payment on Shipment FOB evidenced by clean-on-board Bill of Lading and receipt of all drawings and data as required by MR Section 3. Pro rata for partial shipments.

NOTE: Payment of all progress billings is subject to Buyer's verification of milestone event completion.

3. SHIPPING TERMS

FOB Port of Export, Le Havre, France

[All terms and conditions as per the International Chamber of Commerce's Incoterms 2000, unless otherwise agreed.]

4. SELLER'S PROMISED SHIPMENTS

May 28, 2006

5. ORIGIN OF SHIPMENT

France

6. SHIPPER

SAGEM SA

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SECTION 1 - COMMERCIAL NOTES

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PURCHASE ORDER
COMMERCIAL NOTES

7. TAGS

Stainless steel or plastic tags (foil strip is not acceptable) shall be firmly attached by stainless steel wire or stainless steel screws to each separate item. Each tag shall be stamped with, as a minimum:

- A. Purchase Order Number
- B. Purchase Order item number
- C. Equipment/Instrument Tag number

The cost for tags is included as part of the item cost.

8. PROPRIETARY INFORMATION

This Purchase Order and all drawings, design, and specifications and other data appended or related to it (if not furnished by SELLER) are the property of the BUYER and are delivered for the purpose of enabling the SELLER to perform the scope of work under this Purchase Order. The Information contained or appended to it is not to be disclosed or released for any other use or purpose without prior written consent from the BUYER, and must be returned when requested.

9. SELLER'S TECHNICAL SERVICES

SELLER will provide services of Seller's Representative at the project jobsite for guidance during installation, erection, commissioning, start-up or operator training, as required by BUYER, as per the terms and conditions defined in Section 4B Special Conditions, Article 4. The description and compensation for such services is given below:

a) Description of Services: On-Site Supervision

b) Schedule of rates (in EURO)

1	Lump sum mobilization and demobilization cost (per representative basis)	900.00 EURO / roundtrip
2	Per day rate for 10 hour/day (on 60 hours per week basis)	750.00 EURO / day
3	Overtime rate per hour for work beyond normal working hours of 10 hours / day and holiday / weekend	150.00 EURO / hour

c) Conditions:

- (i) While in Iceland, local transport from / to Reykjavik airport, local camp accommodation, food and local transport to and from the jobsite will be provided by BUYER.
- (ii) Lump sum mobilization and demobilization cost payment on a per representative basis covers all costs for mobilizing the SELLER's representative, including all transportation to and from Reykjavik airport Iceland and travel time to and from the Jobsite. Travel to and from assignment shall be by the most direct route using least cost, economical airfare. This lump sum shall be paid in two equal instalments, the first upon complete mobilization and the second upon satisfactory completion of its Work and complete demobilization.
- (iii) Representative's Chargeable time is in effect for the representative's time on-site and shall not include in-transit time or time used to service warranty claims.
- (iv) Jobsite workweek is Monday through Saturday, 10 hours per day and 60 hours per week.
- (v) The Representative will attend on-site meetings at BUYER'S request.

d) Invoices for technical services will be raised on monthly basis.

Bechtel Overseas Corporation as Agent
Fjarðaal Smelter Project

SECTION 1 - COMMERCIAL NOTES

PURCHASE ORDER
COMMERCIAL NOTES

10. MODIFICATION TO SECTION 4A GENERAL CONDITION / SECTION 4B SPECIAL CONDITIONS

The Project's *General Conditions* and *Special Conditions* apply except as noted below:

General Conditions – Section 4A:

Item 9 – Warranties and Guarantees, the following paragraph is added:

"The Supplier shall not be liable for cable if not laid under supervision of the Supplier experts and or terminations if not assembled by Supplier's jointers. In that case, the guarantee / warranty / responsibility will be limited to cable and terminations direct replacement only."

Item 4 – Price and Payment now reads:

"Payment terms are net thirty (30) days..." instead of sixty (60) days.

11. PERFORMANCE BANK GUARANTEE

SELLER will submit a performance bank guarantee for 10% of purchase order value within 30 days of the date of this AGREEMENT as per Article 10 of Section 4B Special Conditions.

Section 1.2 - Work Not Included

Cable routing.
Civil installation.
Pulling, termination and connections.

Section 1.4 - Battery Limits

Buyer will do pulling, termination and connections.



SECTION 4A – GENERAL CONDITIONS

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The definitions are in article 1. of Section 4B – Special conditions.

1. **ENTIRE AGREEMENT:** This AGREEMENT embodies the entire AGREEMENT between BUYER and SELLER. The parties shall not be bound by or liable for any statement, representation, promise or understanding not set forth herein. Nothing contained in proposals, correspondence, discussions, order acknowledgments or other of SELLER'S forms has any effect on this AGREEMENT unless specifically incorporated herein.

SELLER represents that SELLER has the right to enter into this AGREEMENT and furnish materials and related services for BUYER and that there are no restrictions whatsoever imposed on SELLER nor any conflict of interest which would prevent or conflict with SELLER'S performance and compliance with all the provisions of this AGREEMENT.

SELLER further represents that SELLER will not undertake consulting work or projects, including research or development projects, for or on behalf of, a client other than BUYER or OWNER when, as determined by BUYER or OWNER, a conflict of interest may result between this AGREEMENT and the undertaking of the proposed consulting work or project.

2. **SAFETY:** SELLER shall ensure the safety of BUYER'S representative while at the premises of SELLER and any of SELLER'S sub-suppliers or otherwise in connection with the supply of Products under this AGREEMENT. If, at any time, BUYER'S representative attending at the premises of SELLER or its sub-supplier(s) deems that the conditions at the premises are unsafe, the representative shall be entitled to suspend his/her activities at the premises (including but not limited to activities relating to expediting, quality surveillance, testing, inspection and shipment) until such time as the unsafe conditions are resolved to the representative's reasonable satisfaction.

Tests and inspections, which are required to be conducted in the presence of BUYER'S representative, shall be scheduled by the SELLER accordingly. SELLER shall be fully responsible for any resulting delay to the delivery schedule for having to reschedule a test where BUYER was not timely notified by SELLER. In those instances where BUYER has been duly notified of the conduct of tests and inspection, which are required to be conducted in the presences of BUYER's representative, but the tests and inspection is delayed by the SELLER, SELLER shall be liable for all costs and expenses incurred by BUYER due to such delay and subsequent resumption of the BUYER's representative's presence at the premises, including the additional costs of labor, transportation and lodging. SELLER further agrees that in performance of this AGREEMENT its representatives, agents and/or subtier suppliers shall not allow through omission or permission, any act or thing which contravenes reasonable safety standards or laws, which endanger the safety of any person, and in any event shall take all necessary precautions to ensure the safety and health of all persons who should come in contact with SELLER'S PRODUCT(S).

3. **CHANGES:** BUYER, through its authorized procurement representative, may at any time direct, in writing, changes, including but not limited to changes in any one or more of the following: (1) BUYER'S drawings or specifications; (2) additions to or deletions from quantities ordered; (3) delivery schedule; (4) method of shipment or packing; (5) place of delivery. If any such change causes an increase or decrease in the cost of or timing required to provide the PRODUCT(S), an equitable adjustment may be made in the price or delivery schedule, or both, and the AGREEMENT shall be modified by written amendments or revisions executed by authorized representatives.

If this AGREEMENT requires BUYER to review and comment on SELLER'S technical documents, SELLER may issue a request for adjustment for implementation of BUYER'S comments. No adjustment will be made hereunder unless BUYER, through its authorized procurement representative, confirms the change in writing.

Any request by the SELLER for adjustment under this Changes clause must be asserted within ten (10) days from the date of receipt by the SELLER of the notification of change or comments to

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SELLER'S technical documents. However, nothing in this clause shall excuse SELLER from proceeding with the AGREEMENT as changed.

No modifications of these General Conditions shall be valid unless reduced to writing and signed by both parties.

4. **PRICE AND PAYMENT:** The prices herein specified, unless otherwise expressly stated, shall exclude all taxes and duties of any kind which either party is required to pay with respect to the sale of PRODUCTS covered by this AGREEMENT, but shall include all charges and expenses in connection with the packing of the PRODUCTS and their carriage to the place of delivery to the BUYER unless specifically excluded. SELLER shall be paid, except as otherwise stated in this AGREEMENT, upon submission of proper invoices, the prices stipulated herein for PRODUCTS delivered and accepted; however, payment may be withheld or portions thereof may be deducted if in BUYER'S reasonable opinion SELLER is not performing work in accordance with the provisions of this AGREEMENT or if proper set-offs in favor of BUYER in other transactions are asserted. BUYER reserves the right to make payments due hereunder directly to suppliers of SELLER whenever BUYER has reason to believe SELLER has not paid or is likely not to pay such suppliers amounts due them on a timely basis.

SELLER shall maintain at all times adequate cost records and accounts related to this AGREEMENT.

BUYER shall have the right to examine, with advance notification, such records and accounts for the limited purpose of verifying requests for payment when costs are the basis for such payment or for evaluating the reasonableness of proposed price adjustment requests.

Payment terms are net thirty (30) days from receipt of proper invoice, subject to any limitations as provided elsewhere in this AGREEMENT. Invoices shall be mailed at the time of shipment and any cash discount period offered by SELLER shall be computed from the date the PRODUCTS are transferred to BUYER or the proper invoice is received, whichever is later, and provided required certification documents are received by BUYER. The foregoing payment and cash discount periods shall be extended by the period of any delay caused by an error in the invoice requiring correction. BUYER may elect to pay SELLER through BUYER'S electronic disbursement system (EDS). SELLER shall advise BUYER in writing within thirty (30) days prior to due date of first invoice of the bank and account number to which EDS payments may be made to SELLER.

5. **DELIVERY:** Timely performance and delivery in accordance with the schedule herein are essential to this AGREEMENT. However, SELLER will not be liable for delays in performing its obligations to the extent the delay is caused by an unforeseeable condition which is beyond SELLER'S reasonable control without SELLER'S fault or negligence. Acts of God, such as storms or floods, as well as government priorities, acts of civil or military authorities, fires, epidemics, war or riot are examples of events which will be excusable for being beyond SELLER'S reasonable control, only upon fulfillment of the following conditions; (a) within seven (7) days of the commencement of any excusable delay, SELLER shall provide BUYER with written notice of the cause and extent thereof as well as a request for a schedule extension for the estimated duration thereof; and (b) within seven (7) days of the cessation of the event causing delay, SELLER shall provide BUYER with written notice of actual delay incurred, upon receipt of which the date of promised delivery shall be extended for the time actually lost by reason of an excusable delay.

6. **TITLE AND RISK OF LOSS:** Except as otherwise provided herein, all PRODUCTS furnished by SELLER hereunder shall become the property of BUYER or OWNER, as applicable, upon payment therefore or upon delivery, whichever occurs earlier. Notwithstanding the foregoing, SELLER shall be responsible for and shall bear any and all risk of loss or damage to the PRODUCTS until delivery thereof in accordance with the delivery provisions of this AGREEMENT. Upon such delivery, SELLER shall cease to bear the risk of loss or damage; provided however, that any loss or damage, whenever occurring, which results from SELLER'S nonconforming packaging or crating shall be borne by SELLER.

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All drawings and physical and electronic documents relating to TIA, which are created under the AGREEMENT, are and will be the property of the OWNER. SELLER shall not be liable for the OWNER'S use of documents for other than their intended purpose.

Developments that are TIA are owned by the OWNER. Developments that are TIEPC are owned by BUYER.

To the extent permitted by law, any Developments that are TIA, including software, that generate copyrightable material will fall within the definition of "work for hire" and thus be considered "work made for hire"; and SELLER acknowledges that by so considering any Developments that are TIA as "work made for hire" that OWNER will own all right, title and interest in and to any copyright associated with such Developments that are TIA. To the extent under applicable law that such work may not be deemed "work made for hire", SELLER expressly assigns and agrees to assign to the OWNER all right, title and interest in and to SELLER'S copyright for such work. SELLER will execute and deliver to the OWNER such instruments of transfer and take other such action that the OWNER may reasonably request, including, without limitation, such assignments and other documents required to vest in the OWNER the entire right, title and interest in and to any copyright associated with such Developments that are TIA.

SELLER agrees that any Developments that are TIA are the exclusive property of the OWNER, and SELLER will not sell, trade, give or intentionally make available any Developments that are TIA to any private or public individual, corporation or other entity and will take all reasonable precautions to prevent the illegal use or disclosure of such Developments that are TIA.

7. **EXPEDITING:** The PRODUCTS, including all warranty work, shall be subject to expediting by BUYER. BUYER'S representatives shall be afforded free access during working hours to SELLER'S plants, and SELLER agrees to procure a similar right for BUYER, for expediting purposes with respect to SELLER'S suppliers. As required by BUYER, SELLER shall supply schedules, progress reports and unpriced copies of SELLER'S purchase orders and subcontracts for BUYER'S use in expediting. SELLER shall notify BUYER in writing of any actual or anticipated delays immediately upon discovery. Such notice shall include an estimated period of delay, cause, and corrective actions being taken. Slippage in SELLER'S schedule may be deemed to be reasonable grounds for insecurity in which event BUYER may demand in writing that SELLER provide adequate assurances that SELLER will perform on time.
8. **QUALITY STANDARDS:** SELLER shall ensure that the PRODUCTS comply with the standards of quality specified by this AGREEMENT or those customary in the industry if no requirement is specified. BUYER'S quality surveillance representative shall be afforded free access during working hours to plants of SELLER and SELLER agrees to procure a similar right for BUYER for quality surveillance purposes with respect to SELLER'S suppliers in order to monitor compliance with quality requirements. BUYER'S right to inspect, examine, and test the PRODUCTS shall extend through the manufacturing process, the time of shipment and a reasonable time after arrival at the final destination. SELLER'S failure to adhere to the standards of quality required under this AGREEMENT shall be deemed to be reasonable grounds for insecurity. BUYER may demand in writing, that SELLER provide adequate assurances of SELLER'S ability to meet said standards.

The PRODUCTS shall not be deemed accepted until finally inspected and accepted by BUYER'S representative at final destination. The making or failure to make an inspection, examination or test of, or payment for, or acceptance of the PRODUCTS shall in no way relieve the SELLER from its obligation to conform to all of the requirements of this AGREEMENT and shall in no way impair BUYER'S right to reject or revoke acceptance of nonconforming PRODUCTS, or to avail itself of any other remedies to which BUYER may be entitled, notwithstanding BUYER'S knowledge of the nonconformity, its substantiality or the ease of its discovery.

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9. **WARRANTIES AND GUARANTEES:** SELLER warrants that the PRODUCTS shall be free from liens and from defects in design, material, workmanship, and title, and shall conform in all respects to the terms of this AGREEMENT and to the applicable drawings issued for manufacture, and shall be new and of the best quality, if no quality is specified. Unless the warranty period is otherwise specified in this AGREEMENT, the following warranty shall apply: if, any time prior to one (1) year from the date of Ready for First Hot Metal at OWNER'S facility, or, with respect to liens, title or latent defects at any time, it appears that the PRODUCTS, or any part thereof, do not conform to these warranties, and BUYER so notifies SELLER within the warranty period, SELLER shall promptly correct such nonconformity to the satisfaction of the BUYER, at SELLER'S sole expense; failing which BUYER may reject or revoke acceptance, and cover by making any reasonable purchase of PRODUCTS in substitution for those rejected and the SELLER will be liable to the BUYER for any additional costs for such substituted PRODUCTS; or BUYER may proceed to correct SELLER'S nonconforming work by the most expeditious means available, and the costs for such correction shall be for SELLER'S account; or BUYER may retain the nonconforming PRODUCTS and an equitable adjustment reducing the order price to reflect the diminished value of such nonconforming PRODUCTS will be made by written revision.

SELLER further warrants any and all corrective actions it performs against defects in design, equipment, materials and workmanship for a period of twelve (12) months, in addition to any existing warranty period, following acceptance by BUYER of the corrected work.

SELLER'S liability hereunder shall extend to all damages proximately caused by the breach of any of the foregoing warranties, including incidental damages, such as disassembly, removal, inspection, re-installation, re-testing, costs of transportation or warehousing.

The SELLER shall not be liable for cable if not laid under supervision of the SELLER'S experts and or terminations if not assembled by SELLER'S jointers. In that case, the guarantee / warranty / responsibility will be limited to cable and terminations direct replacement only.

10. **INFRINGEMENT:** SELLER shall, at its own expense, hold harmless and defend BUYER and OWNER under this AGREEMENT against any claim, suit, or proceeding which is based upon a claim, whether rightful or otherwise, that any PRODUCTS, or any part thereof, furnished by SELLER under this AGREEMENT, constitutes an infringement of any patent, copyright, trademark or trade secret and SELLER shall pay all resulting damages and costs. In case said PRODUCTS, or any part thereof, are in such suit held to constitute infringement and/or use is enjoined, the SELLER shall, at its own expense, subject to the following provisions, either procure for the BUYER and OWNER an irrevocable, royalty-free license to continue using such PRODUCTS, or with BUYER'S prior written approval, replace same with substantially equal but non-infringing PRODUCTS or modify them so they become non-infringing, provided that no such replacement or modification shall in any way amend or relieve SELLER of its warranties and guarantees set forth in this AGREEMENT.

The preceding paragraph shall not apply to any PRODUCTS, or any part thereof, manufactured to BUYER'S or OWNER'S detailed design. As to such PRODUCTS or part, the SELLER assumes no liability whatsoever for infringement.

This indemnity is given upon the condition that BUYER or OWNER shall promptly notify SELLER of any claim or suit or proceeding in which such infringement is alleged, and shall permit SELLER to control completely the defense or compromise of any such allegation of infringement, and shall render such reasonable assistance at SELLER'S cost in the defense thereof as SELLER may require.

Notwithstanding any proprietary legends or copyright notices to the contrary, BUYER or OWNER may copy or reproduce documents and information furnished by SELLER in connection with SELLER'S proposal and with this AGREEMENT and distribute such copies or reproductions to others for the limited purposes of designing, constructing, operating, maintaining or licensing the Project. SELLER is responsible for obtaining necessary permission and releases from any third

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parties placing proprietary rights or copyrights on such documents or information and shall, at its own expense, hold harmless and defend BUYER and OWNER against any and all claims, suits or proceedings based upon a claim whether rightful or otherwise that a proprietary right or copyright has been infringed by copying, reproduction, distribution or use by BUYER or OWNER.

11. **COMPLIANCE:** SELLER warrants that all PRODUCTS shall have been produced, sold, delivered and furnished in strict compliance with all applicable laws and regulations to which the PRODUCTS are subject. SELLER shall execute and deliver to BUYER any documents as may be required to effect or to evidence such compliance. All laws and regulations required to be incorporated in agreements such as this one are hereby incorporated herein by reference.

SELLER hereby agrees to indemnify, defend and hold BUYER, OWNER and its respective affiliates harmless from and against any and all claims, legal actions, final judgments, reasonable attorneys' fees, civil fines and any other losses which any of them may incur as a result of the sale or delivery to BUYER hereunder of PRODUCTS which do not meet all requirements of such laws and regulations.

SELLER is to comply with all applicable export or import rules and regulations. When required by the Purchase Order shipping/delivery terms, SELLER is to obtain any necessary export license in a timely manner to avoid shipment delays. When BUYER is required by the Purchase Order shipping/delivery terms to obtain any necessary export license, or to meet the import rules and regulations of the destination country, SELLER is to timely provide all necessary compliance assistance to BUYER and its agents. SELLER shall indemnify, defend and hold harmless BUYER from any penalties, suits, liabilities or costs (including attorney fees) proximately caused by SELLER'S failure to comply with applicable export and import rules and regulations or to comply with its export and import obligations set forth in this Purchase Order.

Seller agrees to comply with any applicable BUYER' and/or OWNER rules and regulations in performance of this AGREEMENT.

12. **ASSIGNMENT:** Any assignment of this AGREEMENT or of any rights hereunder in any manner, in whole or in part, by operation of law or otherwise, without the prior written consent of BUYER shall be void. Upon ten (10) days written notice to BUYER, SELLER may assign monies due or to become due under this AGREEMENT, provided that any assignment of monies shall be subject to proper set-off in favor of BUYER and any deductions provided for in this AGREEMENT.

BUYER shall be permitted to assign any portion of its obligations under this AGREEMENT to OWNER, at any time. In the event this occurs, BUYER will provide reasonable notice of the assignment to SELLER.

13. **SUSPENSION:** Notwithstanding any other provisions of this AGREEMENT, BUYER may at any time, suspend, or extend the time for, SELLER'S performance, upon ten (10) days prior written notice of such suspension or extension. Thereafter, SELLER shall resume performance as directed by BUYER. In the event of such suspension or extension, SELLER shall be entitled to reimbursement for additional costs reasonable and necessarily incurred by SELLER in effectuating such suspension or extension period, to the extent that such additional costs are actually incurred, if claimed within thirty (30) days after resumption of performance.

14. **TERMINATION FOR CONVENIENCE:** SELLER'S performance under this AGREEMENT may be terminated by the BUYER for its convenience in accordance with this clause in whole, or, from time to time in part whenever the BUYER shall elect. Any such termination shall be effected by delivery to SELLER of a notice of termination specifying the extent to which performance under the AGREEMENT is terminated, and the date upon which such termination becomes effective. Upon receipt of any such notice, SELLER shall, unless the notice requires otherwise: (1) immediately discontinue work on the date and to the extent specified in the notice; (2) place no further orders for materials other than as may be necessarily required for completion of any portion of the work that is not terminated; (3) promptly make every reasonable effort to either obtain cancellation on terms

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satisfactory to BUYER of all orders to sub-suppliers or assign those orders to BUYER; and (4) assist BUYER upon request in the maintenance, protection, and disposition of property acquired by BUYER under this AGREEMENT.

If requested in writing within thirty (30) days after notice of termination, the BUYER will pay to SELLER: as full compensation: (1) all amounts due and not previously paid to SELLER for PRODUCTS completed in accordance with this AGREEMENT prior to such notice, and for work thereafter completed as specified in such notice; (2) a reasonable amount for any PRODUCTS then in production; provided that no such adjustment shall be made in favor of SELLER with respect to any PRODUCTS which are SELLER'S standard stock; (3) reasonable costs of settling and paying claims arising out of the canceled orders; and (4) a reasonable profit for costs incurred in the performance of the work terminated; provided, however, that if it appears that the SELLER would have sustained a loss on the entire AGREEMENT had it been completed, no profit shall be included.

The total sum to be paid to SELLER under this clause, shall not exceed the total AGREEMENT price as reduced by the amount of payments otherwise made and as further reduced by the AGREEMENT price of work not terminated, and will not include any consideration for loss of anticipated profits on the terminated work, all claims for which SELLER agrees to waive.

15. **TERMINATION FOR DEFAULT:** BUYER may terminate the whole or any part of SELLER'S performance under this AGREEMENT in any one of the following circumstances: (1) if SELLER fails to make delivery of the PRODUCTS or to perform within the time specified herein or any extension thereof; or (2) if SELLER delivers nonconforming PRODUCTS; or (3) if SELLER fails to provide adequate assurance of SELLER'S ability to meet the quality standards or the delivery date(s) of this AGREEMENT; or (4) if SELLER fails to perform any of the other provisions of this AGREEMENT in accordance with its terms or so fails to make progress as to endanger performance of this AGREEMENT. In the event of any such failure, BUYER will provide SELLER with written notice of the nature of the failure and BUYER'S intention to terminate for default. In the event SELLER does not cure such failure within ten (10) days of such notice, BUYER may, by written notice, terminate this AGREEMENT.

In the event BUYER terminates this AGREEMENT in whole or in part as provided in this clause, BUYER may procure, upon such terms and in such manner as BUYER may deem appropriate, PRODUCTS similar to those so terminated and SELLER shall be liable to BUYER for any additional costs for such similar PRODUCTS; provided, that SELLER shall continue the performance of this AGREEMENT to the extent not terminated under the provisions of this clause.

SELLER agrees to assist BUYER in the event that re-procurement action is necessary as a result of default, by co-operation in the transfer of information, in the disposition of work in progress or residual material, and in the performance of other reasonable requests made by BUYER.

If, after notice of termination of this AGREEMENT, it is determined for any reason that SELLER was not in default under the provisions of this clause, or that the default was excusable under the provisions of this AGREEMENT, the rights and obligations of the parties shall be the same as if the notice of termination had been issued pursuant to the Termination for Convenience clause.

16. **NON-WAIVER:** Failure by BUYER to insist upon strict performance of any of the terms and conditions hereof, or failure or delay in exercising any rights or remedies provided herein or by law, or to properly notify SELLER in the event of breach, or the acceptance of or payment for any PRODUCTS hereunder, or review of design, shall not release SELLER from any of the warranties or obligations of this AGREEMENT and shall not be deemed a waiver of any right of BUYER to insist upon strict performance hereof or a waiver of any of its rights or remedies as to any such PRODUCTS regardless when shipped, received or accepted, or as to any prior or subsequent default hereunder, nor shall any termination of this AGREEMENT by BUYER operate as a waiver of any of the terms hereof. A requirement that a SELLER furnished document is to be submitted for or subject to "Authorization to Proceed", "Approval", "Acceptance", "Review", "Comment", or any

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combinations of such words or words of like import shall mean, unless the AGREEMENT clearly indicates otherwise, that the SELLER shall, before implementing the information in the document, submit the document, obtain resolution of any comments and BUYER'S authorization to proceed. Such review shall not mean that a complete check will be performed. Authorization to proceed shall not constitute acceptance or approval of design details, calculations, analyses, tests, or construction methods or materials developed or selected by SELLER and shall not relieve SELLER from full compliance with requirements of this AGREEMENT.

Those provisions of this AGREEMENT that by their very nature survive payment, final acceptance or termination under the AGREEMENT shall remain in full force and effect after such acceptance and payment.

17. **APPLICABLE LAW:** The definition of terms used, interpretation of this AGREEMENT and rights of the parties hereunder shall be construed under and governed by the laws of the jurisdiction of the State of Pennsylvania, USA.
18. **RELEASE OF CONSEQUENTIAL DAMAGES:** SELLER will not be responsible for or held liable to BUYER or OWNER for consequential damages, including, without limitation, liability for loss of use of the Project, facilities or loss of use of property; loss of profits; loss of product or business interruption; special, punitive or exemplary damages, however the same may be caused. This provision shall survive any termination of this AGREEMENT.



SECTION 4B – SPECIAL CONDITIONS

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1. DEFINITIONS:

"AGREEMENT" means this purchase order, including these General Conditions, Special Conditions, all exhibits, schedules, and supplements hereto (each of which is hereby incorporated herein by reference), as amended from time to time.

"BECHTEL" means the Bechtel entity executing this AGREEMENT, and all of its authorized representatives, partners and affiliates acting in their professional capacities.

"BUYER" means BECHTEL whether acting on its own behalf or as agent for OWNER. To the extent that BUYER is not the ultimate consumer of the PRODUCTS being herein purchased, all rights, benefits and remedies conferred upon BUYER by this AGREEMENT shall also accrue and be available to and are for the express benefit of OWNER for which the PRODUCTS are purchased.

"OWNER" means Fjarðaál sf. and its authorized representatives, affiliates, partners, shareholders and successors in interest.

"PRODUCT" means the goods, materials, articles, equipment, supplies, drawings, data, processes and all other property and services, including design, expediting, inspection, delivery, installation, and testing, specified or required to furnish the items ordered hereunder.

"SELLER" means the company whose name appears on Page 1 of this AGREEMENT, its affiliates, partners, authorized representatives, successors, subcontractors and permitted assigns.

"Affiliate" or "Affiliates" means one or more corporations or other forms of business enterprise that control, are controlled by, or are under common control with either party to the AGREEMENT. For this purpose "control" refers to the existence of either (a) ownership of at least fifty percent of the voting capital stock or equivalent or (b) actual ability to direct the business affairs of the enterprise controlled, and includes cases where the control exists through one or more intermediary enterprises or entities.

"Agent" means the legal representative of the OWNER, empowered to speak or act on behalf of the OWNER when providing procurement services under this AGREEMENT.

"Development(s)" means an invention, discovery and/or modification to TIA or TIEPC, as the case may be, which is conceived or reduced to practice between 12 June 2003 and the date of termination of the SUBCONTRACT and which is made or developed in the course of activities under or in anticipation of the SUBCONTRACT.

"Jobsite" means Fjarðaál, Reyðarfjörður, Township of Fjarðabyggð, Eastern Iceland for construction of the smelter, dock and alumina unloading facilities, at which location construction activity shall be performed under this subcontract.

"Parties" means SELLER, BUYER and/or OWNER collectively.

"Project" means the Fjarðaál Project for OWNER located at Fjarðaál, Reyðarfjörður, Township of Fjarðabyggð, Eastern Iceland for construction of the smelter, dock and alumina unloading facilities, for which the Work under this AGREEMENT is being performed.

"Ready for First Hot Metal" means achievement of that Progress Milestone when a quarter (i.e. 84 reduction cells) of the pot line together with all the other necessary process and production systems for that quarter have attained Mechanical Completion such that the said quarter is ready for heat-up and acceptance of liquid bath. This is estimated to occur on 30 April 2007.



SECTION 4B – SPECIAL CONDITIONS

Fjarðará Smelter Project

"Technical Information – Aluminum" or "TIA" means Technology that is used or usable in the aluminum industry, including, without limitation, mining, refining, smelting, processing and manufacturing of aluminum products.

"Technical Information – Engineering, Procurement and Construction" or "TIEPC" means Technology that is used or usable in the general provision of engineering, procurement or construction management services or generally in construction of industrial facilities, such as project management and engineering procedures, systems, controls, contract documentation, and management tools, and which is not TIA.

2. NONDISCLOSURE:

SELLER agrees not to divulge to third parties, without the prior written consent of BUYER, any information obtained from or through BUYER or learned or made by BUYER, including but not limited to TIA and TIEPC in connection with the performance of this AGREEMENT unless (i) the information is known to SELLER prior to obtaining the same from BUYER; (ii) the information is, at the time of disclosure by SELLER, then in the public domain; or (iii) the information is obtained by SELLER from a third party who did not receive the same directly or indirectly from BUYER, its affiliates or related entities or its customers, and who has no obligation of secrecy with respect thereto. SELLER further agrees it will not, without the prior written consent of BUYER, disclose to any third party any information developed or obtained by SELLER in the performance of this AGREEMENT except to the extent that such information falls in the category of (i), (ii), or (iii) above. If so requested by BUYER, SELLER further agrees to require its employees and its sub-suppliers and their employees to execute an appropriate nondisclosure AGREEMENT prior to performing any work under this AGREEMENT.

SELLER shall assure that all writings, drawings, pictures and other documents created by SELLER or a permitted disclosee hereof that contains information subject to the obligations herein will be marked with the legend "Confidential – Access Limited to Persons under Obligation of Confidentiality to OWNER, BUYER or named Affiliates".

SELLER shall not knowingly engage as one to whom information may be disclosed, any producer of primary aluminum or of an Associated Company of such a primary producer, except as agreed to in writing by BUYER.

SELLER shall assure that all persons who perform the Work on SELLER'S behalf (i) are informed of their nondisclosure obligations and of SELLER'S obligations under this AGREEMENT and will comply with such obligations and (ii) have signed BUYER'S form of confidentiality agreement as provided herein, provided that SELLER shall have satisfied this requirement when its standard employment terms adequately covers the substance of BUYER'S approved form of confidentiality agreement. SELLER agrees to provide BUYER upon request, certified true copies of the original documents in which the above obligations are reflected.

SELLER will assure that all Affiliates and subtier suppliers that perform Work under the AGREEMENT will have undertaken legally binding obligations to the benefit of and enforceable by the OWNER and BUYER. SELLER will provide BUYER, upon request, with originals of the documents by which such obligations are undertaken.

3. BACKCHARGES:

In the event the PRODUCTS are found to be defective as to workmanship or materials or not to be in conformance with this AGREEMENT, it is the responsibility of SELLER to promptly correct any deficiency when so directed. BUYER will take reasonable measures to discover such noncompliance as quickly as practical; however, failure to do so shall in no way relieve SELLER of its responsibility during the term of this AGREEMENT and for the warranty period to promptly make such modifications as are required.



SECTION 4B – SPECIAL CONDITIONS

Fjarðaal Smelter Project

If upon being notified by BUYER or OWNER of deficient work or PRODUCTS, and having been directed to correct the deficient work or PRODUCTS by a specific date, SELLER states or by its actions indicates its inability or unwillingness to comply, then BUYER or OWNER shall proceed to accomplish the corrective work by the most expeditious means available to it and backcharge SELLER for the cost of the required work. The cost categories for which SELLER is liable hereunder are the same as those prescribed in the General Conditions Article titled "Warranties and Guarantees".

The cost of such backcharge work shall be computed as follows:

- A. Labor shall be charged at actual cost plus 40% to cover payroll additives.
- B. Material shall be charged at net delivered cost.
- C. Equipment and Tool Rentals shall be charged at prevailing rates in the area.
- D. 20% shall be added to items A, B and C for BUYER'S indirect costs, overhead, supervision and administration.

Before proceeding on such backcharge work and, if available, BUYER shall furnish the SELLER with a written estimate of the cost of performing the work, and solicit SELLER'S signed authorization to proceed. Regardless of SELLER'S willingness to provide such written authorization, the BUYER, when forced to proceed with the work, upon completion of the work will invoice the SELLER for actual costs incurred, computed as shown above, or withhold such sum from funds still due the SELLER.

In the event the BUYER or OWNER has to expend additional time performing expediting, inspection or engineering activities because the SELLER states (or by its actions indicates) inability or unwillingness to complete the work in accordance with the terms of this agreement, the BUYER or OWNER shall proceed to perform additional expediting, inspection or engineering to facilitate completion. This action will be taken using BUYER'S or OWNER'S personnel or agents and BUYER will back charge SELLER for the cost of the work at a rate of US 150 Dollars (\$150) per hour plus actual and reasonable expenses.

4. ON-SITE SERVICES OF SELLER'S REPRESENTATIVES:

The following conditions will apply in the event the BUYER requires the services of SELLER'S Representative(s) at the Project site to provide guidance during installation, erection, commissioning, start-up or operator training. The representative will be subject to JOBSITE safety and procedure requirements, inclusive of, but not limited to insurance requirements. A technical service contract may be issued at a later date by BUYER, if required.

4.1 Scope of Services

SELLER'S Representative(s) is required to provide technical assistance, expert guidance and direction to BUYER during installation of SELLER'S PRODUCTS, so as to ensure the PRODUCTS become fully operational in accordance with the requirements of this AGREEMENT

4.2 Description of Services and Compensation

The description of services and compensation is defined in Section 1 of this AGREEMENT. The prices for technical services are firm through the warranty period.

4.3 Responsibility

The SELLER'S Representative(s) shall be fully experienced and properly qualified to advise and give direction for the services provided in this AGREEMENT and shall act for and on behalf of the SELLER. SELLER certifies that it is properly licensed, equipped, organized and financed to provide such advice and direction. SELLER shall act independently and not as an agent of the BUYER or



SECTION 4B – SPECIAL CONDITIONS

Fjarðaal Smelter Project

OWNER in performing this work and maintaining complete control and responsibility over its employees.

4.4 Insurance

SELLER shall, during the performance of work by its representative(s), maintain the following insurance in types and amounts shown below and with insurers satisfactory to BUYER. SELLER'S insurance coverage shall be with financially reputable and recognized insurance carriers with a Best rating of at least A- or its equivalent from other internationally recognized credit agencies, unless otherwise agreed.

4.4.1	Worker's Compensation	Statutory requirements at the location of work and in accordance with SELLER'S established program for employees.
4.4.2	Employer's Liability	1,000,000 US Dollars each occurrence.
4.4.3	General Bodily Injury	*1,000,000 US Dollars each occurrence.
4.4.4	General Property Damage	1,000,000 US Dollars each occurrence.
4.4.5	Automobile Bodily Injury and Property Damage	2,000,000 per person and 2,000,000 each occurrence US Dollars.

*Combined single limit policies for Bodily Injury and Property Damage are acceptable provided the coverage is not less than 1,000,000 US Dollars each occurrence.

Coverage 4.4.3 and 4.4.4 shall apply to the Indemnity AGREEMENT following in Paragraph 4.5.

Prior to performance of any service, SELLER shall furnish BUYER with an original and one (1) copy of the Certificates of Insurance as evidence of the above required insurance and such Certificates shall provide for thirty (30) days written notice to BUYER prior to cancellation thereof.

The Certificates must identify and show the Purchase Order Number and Project Name.

Certificate of Insurance shall be provided to the BUYER within one week of the Notice To Mobilize.

SELLER shall provide any other insurance required by law.

4.5 Indemnity

SELLER hereby indemnifies and shall defend and hold harmless OWNER, BUYER and their subsidiaries and affiliates and the employees or authorized representatives of all the foregoing from and against any and all suits, actions, legal or administrative proceedings, claims, liens, demands, damages, liabilities, interest, attorney's fees, costs, expenses, and losses of whatsoever kind or nature in connection with or incidental to the performance of this AGREEMENT, including those arising out of injury to or death of SELLER'S employees, whether arising before or after completion of the work hereunder and in any manner directly or indirectly caused, occasioned, or contributed to in whole or in part, or claimed to be caused, occasioned or contributed to in whole or in part, by reason of any act, omission, fault or negligence whether active or passive of SELLER, or of its sub-contractors or sub-suppliers or of anyone acting under its direction or control or on its behalf. SELLER'S aforesaid indemnity and hold harmless obligations, or portions or applications thereof, shall apply even in the event of the fault or negligence, whether active or passive, of the party



SECTION 4B – SPECIAL CONDITIONS

Fjarðaál Smelter Project

indemnified to the fullest extent permitted by law but in no event shall they apply to liability caused by the sole negligence or willful misconduct of the party indemnified or held harmless.

For all work in the United States, SELLER specifically waives any immunity provided against this indemnity by an industrial insurance or workers' compensation statute.

BUYER shall cause OWNER to release and hold harmless SELLER from loss or damage caused by the negligence of SELLER, to the physical property of the OWNER and Jobsite or on the Premises in the amount in excess of one hundred fifty thousand United States' dollars (US \$150,000.00) payable by SELLER. After the expiration of the Warranty Period, defined in the General Conditions, SELLER shall have no liability for loss or damage to OWNER'S physical property arising out of the provisions of services under this AGREEMENT except to the extent caused by gross negligence or willful misconduct of any of SELLER'S personnel arising or discovered not later than five years after the expiration of the aforementioned Warranty Period and/or extended Warranty Period for which SELLER, shall have a maximum aggregate liability for loss or damage of \$2,500,000 per occurrence. This provision shall survive any termination of this AGREEMENT.

4.6 Safety, Health and Security

The SELLER'S Representative(s) shall at all times conduct all operations in a manner to avoid the risk of endangerment to health, bodily harm to persons, and damage to property. The SELLER'S Representative(s) shall comply with OWNER'S Project Safety and Health Plan. The SELLER'S Representative(s) shall, in accordance with SELLER'S established practices, have sole responsibility for implementing its safety and health program, taking all safety and health precautions necessary and continuously inspecting all equipment, materials and work to discover, determine and correct any conditions which might result in any of the aforementioned risks. SELLER shall furnish all safety equipment and instructions required for the Work and shall maintain and furnish accident, injury and any other records and reports required by applicable laws and regulations or by BECHTEL.

The SELLER'S Representative(s) shall comply with BECHTEL'S and OWNER'S Jobsite security requirements and at all times conduct operations under this AGREEMENT in a manner to avoid the risk of loss, theft, or damage by vandalism, sabotage or any other means to any work, materials, equipment or other property.

4.7 Income Tax Withholding

The SELLER is aware that the OWNER is obligated to withhold income tax of all payments made to any foreign individuals or entities providing services in Iceland at the applicable rate under Icelandic law then prevailing at the time of payment. If the SELLER requires the OWNER not to withhold any tax, the SELLER is obligated to provide BECHTEL with a certificate from the Icelandic tax authorities certifying that the SELLER is exempt from withholding tax.

5. MARINE CARGO INSURANCE

- 5.1 OWNER will carry All Risk Marine Cargo insurance including "warehouse to warehouse" and temporary storage coverage on a replacement value basis with policy limits equal to the highest valued shipment per any one conveyance over the term of the AGREEMENT. Deductibles and losses not covered shall remain the responsibility of OWNER except SELLER shall be responsible for any loss or damage which is the result of the negligence of SELLER up to an amount of one hundred fifty thousand United States' dollars (US \$150,000.00) per occurrence.



SECTION 4B – SPECIAL CONDITIONS

Fjarðaál Smelter Project

- 5.2 SELLER shall abide by all requirements, instructions and conditions of Buyer's marine cargo insurers and risk management department including the following:
- 5.2.1 SELLER shall not be permitted to utilize Bulk Vessels, as defined in the Lloyds Registry, for transportation of equipment.
 - 5.2.2 No equipment is permitted to be re-spotted or moved after the initial securing on the vessel utilized without the written permission of BUYER. All material must be stowed under deck unless written permission is received from BUYER stating otherwise.
 - 5.2.3 SELLER shall only utilize vessels which meet BUYER'S requirements for insurability (one of which is that SELLER may only utilize vessels which are less than twenty (20) years old and classed A-1 America Bureau or equivalent to execute shipment of any equipment.
 - 5.2.4 In the event that SELLER wants to utilize a vessel which is twenty (20) years old, or older, SELLER shall 1) provided that the vessel is deemed insurable by Buyers insurer, be required to pay Buyer for any required additional insurance premiums and obtain a written waiver from Buyer authorizing use of subject vessel or 2) if subject vessel is deemed uninsurable by Buyers insurer, SELLER shall obtain, at SELLER'S expense, a different vessel which fully meets all requirements of insurability.
 - 5.2.5 Lashing and securing of equipment will be performed by SELLER or SELLER'S authorized representative at the carrier's berth. SELLER must request permission from Buyer, in writing, and SELLER must receive permission from Buyer, in writing, prior to deviating from the requirement. SELLER will notify shipping agent of the presence of Buyer's marine insurance surveyor in order to guarantee access to the vessel at the time of loading and securing of the freight.
 - 5.2.6 Vessels furnished by SELLER, or SELLER'S authorized representative, must provide any and all special equipment (such as spreaders and tackle) to handle on-load and off-load of equipment at port(s) of export, trans-shipment port(s) of import and at the Jobsite construction wharf.
 - 5.2.7 SELLER shall not take any action which would void or make void any claim under Buyer's policy and SELLER shall indemnify and hold harmless Buyer and Owner from all claims, losses, costs, expenses or liabilities arising from a breach of this obligation.
 - 5.2.8 Where requested by Buyer or the marine cargo insurers or their authorized representatives, SELLER will provide at least 30 days Notice of shipping of any equipment including all requested details and arrangements. SELLER shall also provide all reasonable assistance to Buyer or the insurers or their authorized representatives in any survey of loading and discharge and shall comply with any requirements or recommendations or conditions made. Notice is hereby given that in certain circumstances if such Notice or assistance is not provided or such requirements or recommendations or conditions not complied with, claims under the marine cargo insurance and delay in start up cover may become void. In such situation, SELLER shall indemnify and hold harmless Buyer and Owner from any claims, losses, costs, expenses or liability arising therefrom.
 - 5.2.9 When SELLER utilizes a barge for ocean transportation of material, the following requirements must be adhered to by SELLER.

A. Barge must have a Gas Free Certificate / Hot Works Permit.



SECTION 4B – SPECIAL CONDITIONS

Fjarðaal Smelter Project

- B. Freight / material must be surveyed both at origin and destination points for any damage prior to or after the barging operation.
- C. Barge must be at loading facility 24 hours prior to the commencement of loading operations and available for survey.
- D. Tugs and other units providing power to the barge must be surveyed prior to departure when barging operations will include an ocean transit.
- E. Tugs must adhere to Buyer's Trip in Tow Requirement letter when barging operations are included in an ocean transit.

6. RELEASE AGAINST LIENS AND CLAIMS:

SELLER shall promptly pay all claims of persons or firms furnishing labor, equipment or materials used in providing the PRODUCTS. BUYER may require SELLER to submit satisfactory evidence of payment and releases of all such claims. This may include a requirement for SELLER to include an affidavit listing all persons who might otherwise be entitled to file, claim, or maintain a lien of any kind or character, and containing an averment that all of the said persons have been paid in full. If there is any indication of any such unpaid claim, BUYER may withhold payment until SELLER has furnished such evidence of payment and release and SELLER shall indemnify and defend BUYER against any liability or loss arising from any such claim.

In order to assure BUYER and OWNER of the prompt and unrestricted use of the Project for which the PRODUCTS under this AGREEMENT are procured to the extent permitted by law, SELLER waives any and all liens and claims of any kind against any building or structure associated with the Project and agrees to hold BUYER and OWNER harmless from any such liens or claims, which it or its employees, agents or lower tier vendors might otherwise assert in the resolution of disputes arising out of the performance of this AGREEMENT. This waiver is not intended to be, nor will it be construed to be, a limitation of any of SELLER'S other rights under this AGREEMENT or its other legal remedies. SELLER further agrees to incorporate the substance of this provision into all of its agreements with sub-suppliers.

7. HAZARDOUS AND TOXIC SUBSTANCES DISCLOSURE REQUIREMENTS:

In the performance of this AGREEMENT, SELLER shall comply with all applicable laws, rules, requirements, and ordinances including, but not limited to, those relating to environmental law, toxic or hazardous materials, occupational health and safety. If this AGREEMENT calls for the transfer to BUYER and/or OWNER by SELLER of any chemical substance or mixture, or any material which may generate or release a chemical substance or any hazardous agent, SELLER shall provide before or with said transfer a Material Safety Data Sheet (Federal OSHA Hazard Communication Standard, 29 CFR 1910.1200) and label which are current, accurate and complete, which include but are not limited to a statement of PRODUCT hazards and precautions for safe use. Copies of the Material Safety Data Sheet shall include the Purchase Order number, shipping location, and shall be sent to the shipping location identified in this AGREEMENT.

8. BUYER FURNISHED EQUIPMENT (INCLUDING MATERIALS):

If BUYER furnishes equipment to SELLER for SELLER'S use in performing the scope of work of this Purchase Order, title of said equipment shall remain with BUYER. SELLER shall have full responsibility for BUYER owned equipment while at SELLER'S or SELLER'S sub-vendor(s) facilities.

- 8.1 SELLER shall acknowledge receipt of BUYER owned equipment in good order.
- 8.2 Title remains with BUYER though the equipment is stored in SELLER'S facilities and said equipment will not be subject to any liens or bankruptcy proceedings.
- 8.3 The equipment will be stored safely and properly in the SELLER'S facilities and have full value insurance coverage for fire, theft and third party liability provided by the SELLER.



SECTION 4B – SPECIAL CONDITIONS

Fjarðaal Smelter Project

- 8.4 SELLER shall indemnify BUYER and OWNER against any damages, injury or death, which may occur as a result of the BUYER, owned equipment being located in the SELLER'S facilities.

9. DISPUTE RESOLUTION

Any claim arising out of or attributable to the interpretation or performance of this AGREEMENT, which cannot be resolved by negotiation shall be considered a dispute within the meaning of this clause.

If for any reason BUYER and SELLER are unable to resolve a claim for an adjustment, BUYER or SELLER shall notify the other party in writing that a dispute exists and request or provide a final determination by BUYER. Any such request by SELLER shall be clearly identified by reference to this clause and shall summarize the facts in dispute and SELLER'S proposal for resolution.

BUYER shall, within ten (10) calendar days of any request by SELLER, provide a written final determination setting forth the contractual basis for its decision and defining what adjustments it considers equitable. Upon SELLER'S written acceptance of BUYER'S determination the AGREEMENT will be modified and the determination implemented accordingly or, failing agreement, BUYER may in its sole discretion pay such amounts and/or revise the time for performance of the work in accordance with BUYER'S final determination.

If BUYER'S final determination is not accepted by SELLER, the matter shall, be referred to senior executives of the parties who shall have designated authority to settle the dispute. If the dispute remains unresolved, the Parties agree that the dispute shall be referred to mediation by a mediator agreed by the Parties with the mediation to be conducted as agreed between the Parties ("Mediation"). The Mediation shall last no more than three (3) calendar days unless the Parties agree to an extension of time. The costs of the Mediation (including the Mediator's fees, mediation premises and other related costs) shall be borne equally by the Parties. The Parties agree to use their best endeavors and to negotiate in good faith to resolve any dispute at Mediation and will ensure that their respective representatives involved in any Mediation have full power and authority to settle the dispute.

If the dispute has not been resolved within seven (7) calendar days of the conclusion of the Mediation convened, the Parties agree that the dispute shall and is hereby referred to binding arbitration by three arbitrators. One each shall be selected by the Parties who shall endeavor to agree selection of the third failing, which the third shall be referred to and selected by the International Chamber of Commerce under ICC ("Arbitration"). The Arbitration shall be conducted in accordance with the rules of the ICC and shall be held in Pittsburgh, Pennsylvania and the decision of the Arbitration shall be final and conclusive save where ICC rules permit appeal therefrom.

10 PERFORMANCE BANK GUARANTEE:

- 10.1 Unless otherwise specified in this AGREEMENT, SELLER hereby agrees to provide in respect of the PRODUCTS, an irrevocable bank guarantee in favor of BUYER to guarantee the performance by SELLER of its obligations under this AGREEMENT. The bank guarantee shall be delivered to BUYER within thirty (30) days of the date of this AGREEMENT.
- 10.2 The bank guarantee shall be provided or confirmed by a bank or insurance company acceptable to BUYER and shall be in the form set out in Attachment 1 to this Section 4B – Special Conditions of this AGREEMENT.
- 10.3 Unless otherwise specified in this AGREEMENT, the amount of any bank guarantee given in accordance with article 10.1 above shall be ten per cent (10%) of the amount of the AGREEMENT price.



SECTION 4B – SPECIAL CONDITIONS

Fjarðaál Smelter Project

- 10.4 All cost and expense related to the provision of the bank guarantee shall be borne by the SELLER.

11 ACKNOWLEDGMENT AND ACCEPTANCE:

SELLER by acknowledging receipt, by whatever means, of the letter of award and by signing the acknowledgment copy of this AGREEMENT and returning it, or by countersigning this AGREEMENT, signifies full acceptance of this AGREEMENT. If SELLER commences to perform the supply of PRODUCTS under this AGREEMENT prior to such acknowledgment or countersigning, SELLER shall be deemed to have accepted this AGREEMENT.

12 STORAGE:

If for any reason BUYER is unable to accept dispatch of the PRODUCTS at the time the PRODUCTS are due and ready for dispatch in accordance with the terms of this AGREEMENT, BUYER shall so notify SELLER in writing and SELLER shall store the PRODUCTS, safeguard them and take all steps to prevent their deterioration during such storage and BUYER shall be liable to SELLER for the reasonable justified costs, including insurance, of so doing after a period of grace of three (3) months. Should such instruction to store the PRODUCTS operate to interfere with the submission of the invoice for final payment, all other contractual obligations being satisfied, then SELLER shall be entitled to payment of ninety percent (90%) of such invoice, unless stated otherwise in this AGREEMENT, in accordance with General Condition entitled "PRICE AND PAYMENT".

13 PUBLICITY AND ADVERTISING:

SELLER shall not make any announcement, take any photographs, or release any information concerning this AGREEMENT, or the Project, or any part thereof, or make reference to the OWNER or BUYER or their respective Affiliates to any member of the public, press, business entity, or any official body unless prior written consent is obtained from OWNER through BUYER.

14 TAXES:

- 14.1 In the case of VAT assessed in Iceland on the importation of goods, materials or services under this AGREEMENT, SELLER shall cooperate with OWNER or BUYER to provide the necessary written or other such documentation to entitle such importation to the VAT deferral to which OWNER has been granted by the government of Iceland.
- 14.2 In the case of VAT assessed in Iceland on goods, materials or services purchased under this AGREEMENT in Iceland, SELLER shall cooperate with OWNER or BUYER to provide the necessary written or other such documentation to entitle such local VAT to be recovered by the OWNER.

ATTACHMENT 1 to SPECIAL CONDITIONS



SECTION 4B – SPECIAL CONDITIONS

Fjarðaál Smelter Project

FORM OF PERFORMANCE BANK GUARANTEE

In the event that Fjarðaál sf. in its absolute discretion, gives written notice to the Guarantor at any time (without any prior notice) of the failure of the SELLER to perform or fulfill any of the acts of obligations set forth in the Purchase Order, Guarantor hereby unconditionally and irrevocably undertakes, without any right to set off or counterclaim whether on behalf of Guarantor or on behalf of the SELLER, to pay Fjarðaál sf. the sum of (.....) being an amount equal to Percent (.....%) of the price recorded in the PURCHASE ORDER. Such written notice of Fjarðaál sf. shall be conclusively binding on Guarantor for all purposes under the Performance Bond.

Guarantor further agrees that any change, modification, addition or amendment which may be made to the terms and conditions of the PURCHASE ORDER, or to the PRODUCTS or SELLER ON SITE SERVICES to be supplied thereunder, or to the payments to be made on account thereof, or any extension of the time of performance or any composition, settlement, promise not to sue or other forbearance on the part of either Fjarðaál sf. or the SELLER to the other shall not in any way release Guarantor from its continuing liability hereunder, any Guarantor hereby expressly waives its right to consent or to receive notice of any such change, modification, addition, amendment, extension, composition, settlement promise or forbearance.

This Performance Bond shall be valid until the thirtieth day of April 2008 or until the satisfactory expiry of the Period of Warranty as defined in the PURCHASE ORDER, whichever shall be the earlier. Any request for payment hereunder must be received by Guarantor on or before the earlier of such dates.

The Guarantor represents and warrants that the amount of the guarantee herein contained does not exceed twenty percent (20%) of the total paid up capital and reserves of the Guarantor.

This Performance Bond shall be governed by and interpreted under the Laws of the State of Pennsylvania, USA. It shall be returned to Guarantor on its expiry.

Signed:

(as appropriate by properly
Authorised officials for and
On behalf of the Guaranteeing
Bank.)

To:

Note: All Bonds and Guarantees are to be either issued by or confirmed by a first class commercial bank which has a registered branch in USA.



SECTION 5 - SUPPLIER QUALITY SURVEILLANCE

Fjarðaal Smelter Project

1.0 GENERAL

The following quality surveillance clauses are an integral part of this purchase order.

- 1.1 All materials and equipment listed in the purchase order and related parts are subject to quality surveillance by BUYER's representative/agent at the point of manufacture. It is SELLER's responsibility to properly manufacture and to thoroughly inspect the material or equipment prior to its presentation to BUYER for inspection. BUYER's inspections shall not relieve SELLER from any obligation to comply with the requirements of this purchase order.
- 1.2 In order to facilitate BUYER's supplier quality activities, SELLER shall allow BUYER's Supplier Quality Representative free access to SELLER's manufacturing facilities and quality verification records at all times during manufacturing, and shall arrange similar access at Seller's sub-supplier facilities. The quoted prices take into account these inspection requirements.
- 1.3 SELLER shall provide BUYER's Supplier Quality Representative, without additional cost, all necessary facilities to be satisfied that the equipment is being satisfactorily fabricated and tested in accordance with the requirements of the purchase order including the specifications attached in Section 2.
- 1.4 BUYER or SELLER may initiate pre-inspection meetings when either party believes that such meetings are required in order to resolve questions involving compliance with the requirements of the purchase order including attached specifications.
- 1.5 BUYER's Supplier Quality Representative is authorized to issue a "Release for Shipment" and will reject any material that is not of acceptable quality or workmanship, or fails to comply with the specifications or other requirements of the purchase order. This "Release" does not constitute final acceptance on the part of BUYER. Project Traffic & Logistics will allow shipment by assigning a Shipment Control Number (SCN) (refer to Section 7 – SHIPPING AND PACKING INSTRUCTIONS).
- 1.6 SELLER shall ensure that the required number of copies of material data, code forms, charts and other required information is provided to BUYER's Supplier Quality Representative prior to final inspection. BUYER's Supplier Quality Representative will not release the equipment or material until this data has been reviewed and is determined to be acceptable. Missing, incomplete, or incorrect documentation shall be treated as a non-conformance, and shall provide cause for denying SELLER permission to release the material or equipment for shipment.
- 1.7 SELLER shall incorporate these quality surveillance clauses in all suborders issued to sub-suppliers for any equipment or material required to be in compliance with this purchase order.
- 1.8 After Award, SELLER shall submit the controlled copy of the Quality Plan/Inspection and Test Plan (QP/ITP) for the specific scope of supply, for all manufacturing, in accordance with the submittal schedule and methods defined in attachment A of *Section 3 Drawing and Data Requirements* of the Purchase Order.

The QP/ITP shall be prepared as part of the quality planning activity and meet the requirements of ISO 9001:2000. If sub-suppliers are involved, SELLER shall indicate in its QP/ITP, the controls to be exercised over the sub-contracted activities. The BUYER's witness and hold points listed in Attachment A of this section, as BUYER's quality surveillance activities, shall be transcribed by SELLER onto the QP/ITP and its sub-suppliers' QP/ITP.



SECTION 5 - SUPPLIER QUALITY SURVEILLANCE

Fjarðaal Smelter Project

As a minimum, SELLER's QP/ITP should contain the following:

- Activity description
- Description of task, methodology
- Acceptability levels, tolerances for acceptance purposes
- Reference to procedures, codes, standards, etc.
- Personnel responsible
- Level of inspection: monitor, witness, hold, etc.
- Quality records to be completed.

1.9 SELLER shall be responsible for the quality of all items/equipment provided in response to this Purchase Order. SELLER shall not commence manufacture until such time as BUYER has approved the relevant ITPs.

1.10 Downtime and associated expenses incurred by BUYER as a result of SELLER's lack of notification for Witness and Hold points, date changes, or related schedule or quality problems will be charged to SELLER's account in accordance with the Backcharge provisions of this Agreement.

2.0 DEFINITIONS

2.1 Supplier Quality Representative: Supplier Quality Representative (SQR), the person who represents BUYER during the manufacturing phase. The SQR may conduct pre-manufacturing meeting and carry out such surveillance, verification and inspection activities considered necessary by BUYER.

2.2 Quality Surveillance: Quality Surveillance is defined as the selective review, observation and evaluation of processes, procurement, manufacturing operations, quality control systems and programs to determine SELLER's compliance with contractual quality requirements. Quality Surveillance may consist of all or part of the following activities:

Quality Planning
Surveillance Inspection
Supplier Evaluation
Quality Programs Verification
Audit of Quality Programs
Order Status Verification

2.3 Initial Visit: Prior to the start of manufacturing, BUYER's assigned Supplier Quality Representative may conduct an initial visit meeting with SELLER's management to review the quality requirements of the purchase order including the specifications attached in Section 2.

2.4 Witness Points: Witness points are defined as critical steps in manufacturing and testing, whereby SELLER shall advise BUYER's Supplier Quality Representative five (5) working days (unless stated otherwise in the Quality Surveillance Plan) in advance of the operation so that it may be witnessed by BUYER's Supplier Quality Representative. SELLER may proceed with work past the witness point only if BUYER's Supplier Quality Representative cannot attend. In the event BUYER's Supplier Quality department defers a witness point, the next same operation will be witnessed.

2.5



SECTION 5 - SUPPLIER QUALITY SURVEILLANCE

Fjarðaál Smelter Project

Hold Points: Hold points are defined as critical steps in manufacturing and testing whereby SELLER is obligated to advise BUYER's Quality Representative five (5) working days (unless stated otherwise in the Quality Surveillance Plan) in advance of the operation so that it can be witnessed by the Supplier Quality Representative. SELLER cannot proceed with work past the hold point without witness by BUYER's Supplier Quality Representative, except by documented agreement with the Project's Supplier Quality Supervisor.

3.0 LEVELS OF QUALITY SURVEILLANCE

In accordance with the General Conditions, material or equipment covered by this Agreement will be subject to quality surveillance according to the level of surveillance indicated in Attachment A.

4.0 QUALITY SURVEILLANCE PLAN

The minimum quality surveillance requirements of the purchase order are listed in the Quality Surveillance Plan detailed in Attachment A.

BUYER's Quality Surveillance Plan must be incorporated into SELLER's ITP and into SELLER's sub-suppliers ITP, if any. BUYER's Supplier Quality Representative shall be afforded free access to all areas of the plant while any work or test is in progress on any major unit covered by this order, including work performed by sub-suppliers.



MR SECTION 5 – SUPPLIER QUALITY SURVEILLANCE ATTACHMENT A

Fjarðaal Smelter Project
220kV Cables with Terminations

MR N°: 24956-310-MRA-EWG0-00001

LEVELS OF QUALITY SURVEILLANCE

Material or equipment covered by this Agreement will be subject to the following quality surveillance level:

- ☐ Level 0 No Quality Surveillance Required
- ☒ Level 1 Final Quality Surveillance Prior to Shipment
BUYER's Supplier Quality Representative will witness specific activities and verify certain characteristics only prior to shipment. This level may include an Initial Visit.
- ☐ Level 2 Limited Scope Quality Surveillance
BUYER's Supplier Quality Representative will perform predetermined surveillance activities, routine coverage of witness and hold points in accordance with the quality surveillance plan, and final inspection prior to shipment (Level 1).
- ☐ Level 3 Full Scope Quality Surveillance
In addition to the visits to perform surveillance of witness and hold points in accordance with the quality surveillance plan, BUYER's Supplier Quality Representative will visit the manufacturing facility on a regular basis to monitor the work in progress and make progressive reviews of SELLER's quality program implementation.
- ☐ Level 4 Resident Quality Surveillance
BUYER's Supplier Quality Representative will be a resident in the manufacturing facility, and will monitor daily operations of the work in progress as well as witness activities designated as witness and hold points as identified in the quality surveillance plan.

QUALITY SURVEILLANCE PLAN

The minimum quality surveillance requirements of the purchase order are listed in the Quality Surveillance Plan detailed hereafter.

BUYER's Quality Surveillance Plan must be incorporated into SELLER's ITP and into SELLER's sub-suppliers' ITP, if any. BUYER's Supplier Quality Representative shall be afforded free access to all areas of the plant while any work or test is in progress on any major unit covered by this order, including work performed by sub-suppliers.



MR SECTION 5 – SUPPLIER QUALITY SURVEILLANCE ATTACHMENT A

Fjarðaal Smelter Project
220kV Cables with Terminations

MR N°: 24956-310-MRA-EWGO-00001

QUALITY SURVEILLANCE PLAN

LEVEL OF SURVEILLANCE:

No.	ACTIVITY	HOLD POINT	WITNESS POINT	IN PROCESS	NOTES
1.	Initial Visit / Pre-Fabrication				
	Review Purchase Order specifications, data sheets, project special instructions and PO Section 2, Technical Notes. Identify sub-suppliers and get un-priced PO copies to sub-suppliers.	X			
	Review document submittal requirements, engineering review levels, and specified quality level.	X			
	Review specified witness, hold and in-process inspection points with the supplier.	X			
	Advise supplier of notification requirements for witness and hold points.	X			
2.	Drawing and Data Requirements				
	Verify Engineering's review of required drawings, WPS/PQR, NDE, Painting, test procedures and other documents.				Per PO Section 3, verify documents used for inspection have Review Code 1, 2, or 4. Code 2 documents shall have comments verified. Release for shipment is not authorized on Code 2 documents except with Project concurrence.



MR SECTION 5 – SUPPLIER QUALITY SURVEILLANCE ATTACHMENT A

Fjarðaaí Smelter Project
220kV Cables with Terminations

MR N°: 24956-310-MRA-EWG0-00001

QUALITY SURVEILLANCE PLAN

LEVEL OF SURVEILLANCE:

No.	ACTIVITY	HOLD POINT	WITNESS POINT	IN PROCESS	NOTES
3	Materials Verification				
	<p>Verify materials of construction progressively during each visit for quality surveillance purposes.</p> <p>Review and sign off all material certifications.</p>				<p>Material requirements per approved drawings, data sheets, specifications and, as applicable, design codes and standards. Review Records.</p>
4.	Fit up and Welding				
	<p>Review work environment, setup and other conditions which affect successful compliance with requirements of governing WPS.</p> <p>Verify welding personnel qualifications, consumable control/storage as well as pre, interpass and/or post weld temperature controls.</p>				<p>Verify on a first operation basis for a WPS. If results are satisfactory, subsequent reviews on an in-process basis.</p> <p>Note requirement of welder identification marking on welds. Review Records.</p>
	<p>Weld Repairs, assure weld repair procedure, if applicable, reviewed by engineering and welder qualification</p> <p>Weld Repairs are in compliance with applicable code.</p> <p>Verify Complete Excavation of Defect.</p> <p>NDE of Excavation. NDE of Completed Repair.</p>				<p>Supplier to advise of each repair.</p> <p>SQR witness on a first operation basis for each Repair Procedure.</p> <p>Subsequent witness at the discretion of the SQR.</p>
5.	Manufacturing & Testing				
	Factory Acceptance Test	X			<p>As per project specification, if applicable, industry codes, Sellers standard test procedures and standards.</p>



MR SECTION 5 – SUPPLIER QUALITY SURVEILLANCE ATTACHMENT A

Fjarðaal Smelter Project
220kV Cables with Terminations

MR N°: 24956-310-MRA-EWG0-00001

QUALITY SURVEILLANCE PLAN

LEVEL OF SURVEILLANCE:

No.	ACTIVITY	HOLD POINT	WITNESS POINT	IN PROCESS	NOTES
					Note: Test certificated to be submitted to project for approval per Section 3
6.	Surface Preparation and Coating				
	Verify adequacy of surface preparation/cleaning prior to coating, final DFT, and appearance/condition of completed surfaces. Verify compliance with the PO, Engineering, Specifications and Data Sheets referenced.				First operation basis, as applicable. Surface preparation and coating including curing. Review Records
7.	Final Inspection				
	Perform visual inspection for workmanship, welding, dimensions, painting, marking, tagging, cleanliness and materials of construction for compliance to drawings, data sheets, purchase order and specification requirements.	X			Final dimensional inspections shall be on a random basis. Review Records Special attention to verifying cable lengths
	Verify PO Section 3 submittals are complete (Code 1 or 4) to allow release for shipment.	X			Release on Code 2 requires verification of revision per document comments and project concurrence.
	Review Quality Verification Documentation for completeness, accuracy, and legibility and sign documentation as required.	X			Verify that all required Quality Verification Documentation has been completed per PO Section 3 for review.
8.	Packaging and Preparation for Shipment				
	Verify as follows:				
	• Adequacy of packaging, marking, etc.	X			



MR SECTION 5 – SUPPLIER QUALITY SURVEILLANCE ATTACHMENT A

Fjarðaal Smelter Project
220kV Cables with Terminations

MR N°: 24956-310-MRA-EWG0-00001

QUALITY SURVEILLANCE PLAN

LEVEL OF SURVEILLANCE:

No.	ACTIVITY	HOLD POINT	WITNESS POINT	IN PROCESS	NOTES
	<ul style="list-style-type: none"> Equipment and components are clean and free of contaminants Surfaces that require preservation are protected Openings are sealed and protected Items have been tagged, identified, and marked for positive identification Moisture barriers (if applicable) are in place Touch-up painting after preparation for shipment Special handling and marking requirements have been adhered to and are clearly identified during the preparation for transport and reported to PSQS, for use by Traffic & Logistics. 	X X X X X X			
9.	Release for Shipment				
	Notify project SQ Supervisor prior to release	X			SQ-231 Release Form required.

SELLER shall not ship any goods on this order until final inspection has been completed satisfactorily and a Release for Shipment is received from BUYER's Supplier Quality Representative and BUYER authorizes shipment in writing (Shipment Control Number (SCN) assigned, refer to Section 7).

PURCHASE ORDER - REVISION**Fjarðaal sf****Fjarðaal Smelter Project****Fjarðaal sf**

Bechtel Overseas Corporation as Agent
 c/o Bechtel Quebec Limitee
 Fjarðaal Smelter Project
 1500 University Street, Suite 400
 Montreal, Quebec
 Canada - H3A 3S7

PURCHASE ORDER NUMBER:
 24956-310-POA-EWG0-00001
REVISION NUMBER: 2

DATE OF REVISION July 13, 2006

Requisition no.: 24956-310-MRA-EWG0-00001 Rev. 1

TO: Silec Cable

Rue de Varennes Prolongee
 Montereau, France
 77876 Cedex

Attention: Hamid-Reza Hakimi-Tabrizi
Telephone No: 33-1-53-23-71-84
Fax No: 33-1-53-23-73-91
Email: hamid-reza.hakimi-tabrizi@sileccabl

Previous Purchase Value:	1,258,560.60 EUR
Change Value of this Revision:	38,823.00 EUR
Revised Value of Order:	1,297,383.60 EUR

Currency is in Euro Currency Unit

FOR BECHTEL USE ONLY:

1. Job Number: 24956.200
2. Cost Code: see Section 1
3. Commitment Register No.: 5691
4. Extra Charge Approval Request(s) No: 553



PURCHASE ORDER REVISION - DO NOT DUPLICATE
 Notice to proceed sent to supplier June 27, 2006.

Product: 220 kV cables with terminations**SUMMARY OF CHANGE**

This Purchase Order is revised to incorporate the following:

- Add Line Items 16.001, 21.001 and 24.001 - see details on page 2.
- Change of the address above to reflect the Supplier's Headquarter address.

All terms and conditions of this Purchase Order remain the same except as modified by this and previous revisions.

BUYER'S AUTHORIZED REPRESENTATIVE Bechtel Overseas Corporation as Agent  Signature: _____ By: Allan Stewart Project Procurement Manager  Manon Dussault Purchasing Agent Title: _____ Telephone: 514-394-2898 Fax: 514-954-1185 Email: mdussaul@bechtel.com	SELLER'S ACCEPTANCE SELLER is required to acknowledge acceptance of this Purchase Order Revision by returning a copy of this page signed by an authorized representative within one week after receipt of this revision. The authorized representative of SELLER accepts and agrees to furnish the Goods and Services specified in full accordance with only those terms and conditions contained in this Purchase Order as revised. Signature: _____ Print Name: _____ Title: _____ Date: _____
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SECTION 1 - SCOPE OF WORK AND PRICING AND NOTESBechtel Overseas Corporation as Agent
Fiaradaí Smelter ProjectPURCHASE ORDER REVISION
SCOPE OF WORK AND PRICING

Item No.	Prev Rev.	Rev	Prev Qty	Quantity & Unit	Delta Qty	DESCRIPTION	Unit Price	Previous Extend	Delta Extend	Extended Value
16.001		2	0	21 Each	0	Clamp type SL115 for 220 kV cable Project Stock Code EWLFDL000003	139.00	0.00	0.00	2,919.00
21.001		2	0	42 Each	0	Shock absorber supports for 220kV cables. Project Stock Code EWLFDL000008 Cost Code: 0311.WT Drawing No. ENG 00708-1	152.00	0.00	0.00	6,384.00
24.001		2	0	240 Each	0	Clamp type SL85, for 33 kV cable Project Stock Code EWLFDL000012 Cost Code: 0311.WT	123.00	0.00	0.00	29,520.00
						Total Value Euro Currency Unit				EURO 38,823.00

PURCHASE ORDER NO: 24956-310-POA-EWG30-00001 Rev. 2

Page 2 of 2

C1.0033

PURCHASE ORDER - REVISION**Fjarðaal sf****Fjarðaal Smelter Project****Fjarðaal sf**

Bechtel Overseas Corporation as Agent
 c/o Bechtel Quebec Limitee
 Fjarðaal Smelter Project
 1500 University Street, Suite 400
 Montreal, Quebec
 Canada - H3A 3S7

PURCHASE ORDER NUMBER:
 24956-310-POA-EWG0-00001
REVISION NUMBER: 3

DATE OF REVISION August 18, 2006

Requisition no.: 24956-310-MRA-EWG0-00001 Rev. 2

TO: Silec

Rue de Varennes Prolongee
 Montereau, France
 77876 Cedex

Attention: Hamid-Reza Hakimi-Tabrizi
Telephone No: 33-1-53-23-71-84
Fax No: 33-1-53-23-73-91
Email: hamid-reza.hakimi-tabrizi@sileccabf

Previous Purchase Value:	1,297,383.60 EUR
Change Value of this Revision:	32,160.00 EUR
Revised Value of Order:	1,329,543.60 EUR

Currency is in Euro Currency Unit

FOR BECHTEL USE ONLY:

1. Job Number: 24956.200
2. Cost Code: see Section 1
3. Commitment Register No.: 6167
4. Extra Charge Approval Request(s) No: 613, 625

PURCHASE ORDER REVISION - DO NOT DUPLICATE**Product:** 220 kV cables with terminations**SUMMARY OF CHANGE**

This Purchase Order is revised to incorporate the following:

Section 1, Scope of Work and Pricing – line items 26 and 27 are added. See page 2 for details.

All terms and conditions of this Purchase Order remain the same except as modified by this and previous revisions.

BUYER'S AUTHORIZED REPRESENTATIVE
 Bechtel Overseas Corporation as Agent

Signature: _____

By: **Gulshan Saini**
 Project Procurement Manager

Peter Yankov
 Title: Buyer
 Telephone: 514-394-3901
 Fax: 514-954-1185
 Email: pyankov@bechtel.com

SELLER'S ACCEPTANCE

SELLER is required to acknowledge acceptance of this Purchase Order Revision by returning a copy of this page signed by an authorized representative within one week after receipt of this revision. The authorized representative of SELLER accepts and agrees to furnish the Goods and Services specified in full accordance with only those terms and conditions contained in this Purchase Order as revised.

Signature: _____

Print Name: _____

Title: _____

Date: _____

SECTION 1 – SCOPE OF WORK AND PRICING AND NOTES

Bachtel Overseas Corporation as Agent
Fjarðal Smelter Project

PURCHASE ORDER REVISION
SCOPE OF WORK AND PRICING

Item No	Prev Rev	Rev	Prev Qty	Quantity & Unit	Delta Qty	DESCRIPTION	Unit Price	Previous Extend	Delta Extend	Extended Value
26		3	0	280 EA	0	Unipolar clamp model ST 100-130 Project Stock Code EWLFDL000014	63.00	0.00	0.00	17,640.00
27		3	0	660 EA	0	Unipolar clamp model ST 5075 Project Stock Code EWLFDL000015	22.00	0.00	0.00	14,520.00
						Total Value Euro Currency Unit				32,160.00

C1.0035

EXHIBIT C2

REQUEST FOR ARBITRATION



**PROFESSIONAL ENGINEERING REPORT
RF12 RECTIFIER ELECTRICAL FAULT AND FIRE
ALCOA FJARDAAL
REYDARFJORDUR, ICELAND**

Kevin Kennedy Associates Report No. 110304

Prepared for:

Alcoa Inc.

Authors:

Beth Anderson, P.E.
Mark Lautenschlager, P.E.

Date:

March 4, 2011

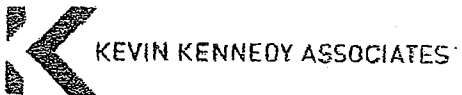
This work was performed pursuant to Kevin Kennedy Services Agreement #11010403 between Kevin Kennedy Associates Inc. and Alcoa. This report has been prepared for Alcoa and only for Alcoa and shall not be relied upon by any other person.

Respectfully submitted,

/s/ Beth Anderson
/s/ Mark Lautenschlager

C O N F I D E N T I A L

C2.0001



1. INTRODUCTION

On December 18, 2010, two related events occurred in the No. 12 (RF12) rectifier bay at the Alcoa Fjardaal aluminum smelter facility near Reydarfjordur, Iceland. The first event was the occurrence of an electrical fault (short-circuit) in the electrical supply equipment for the RF12 rectifier. This electrical fault caused a power outage of RF12 which led to 220000-volt system voltage instability, which then caused a temporary smelter-wide power outage. The second event was a propagating transformer oil-fueled fire immediately following the electrical fault, which destroyed much of the high-voltage power supply equipment for rectifier RF12.

Kevin Kennedy Associates was retained to determine the origin and cause of the electrical fault and of the subsequent fire.

During the period from January 11, 2011 to January 20, 2011, Kevin Kennedy Associates electrical forensic engineers, Beth Anderson P.E. and Mark Lautenschlager, P.E., conducted an on-site electrical failure and fire origin and cause investigation at Alcoa Fjardaal. The fire scene was examined and processed and artifacts were cataloged and retained. An artifact list and collection grid diagram is included at the end of this report as Attachment D.

During the period from February 07, 2011 to February 11, 2011, Anderson and Lautenschlager conducted a laboratory examination of the artifacts at the Innovation Center Iceland facilities in Reykjavik. The retained artifacts were cleaned and closely inspected with the assistance of microscopes, microphotography, scanning electron microscopes (SEM), x-ray and other test equipment. Digital copies of all photographs taken are included at the end of this report as Attachment E. In addition, several documents and test results were reviewed. See section IV of this report for a list of documents and resources.

All components of the rectifier circuit were supplied by Fuji Electric Systems Co., Ltd. (Fuji Electric), except for the cables and cable terminations, which were supplied by the Silec Cable Company (Silec). Both Fuji Electric and Silec were invited to participate in the scene examination and the testing of the artifacts. Fuji participated in the scene inspection and aided in the collection and examination of the artifacts collected at the scene. Silec participated in the examination and testing of the collected artifacts.

2. OPINIONS AND BASES

Opinion #1: Fire Origin and Cause

It is our opinion, to a reasonable degree of engineering certainty, that the RF12 fire originated below the W-phase 220000-volt cable termination box on the north side of the regulating



KEVIN KENNEDY ASSOCIATES

transformer, where an electrical arc caused the W-phase termination to be expelled from the box, releasing oil which was ignited upon expulsion. The fire was fueled by oil released from the W-phase cable box, causing the termination assemblies in the U-phase and V-phase boxes to burn and fall, releasing more oil. The fire continued to propagate and to grow in intensity as heat from the fire caused the U-phase and V-phase spacer bushings between the boxes and the transformer, and the transformer conservator tank oil level gauge, to fail, releasing more oil.

Bases for Opinion #1:

- A. Burn patterns on the external surfaces of the regulating transformer indicate lower and more severe heating in the area of the W-phase cable box. Burn patterns extend to ground level in this area.
- B. Burn patterns in the cable termination boxes indicate that U and V-phase boxes experienced more heat on the south side of the boxes, near the transformer, which caused a large temperature differential across the width of the spacer bushings separating transformer oil from the oil in the boxes. This temperature differential caused the spacer bushings to break and rotate, releasing transformer oil into the fire.
- C. Burn patterns in the W-phase cable box indicate a heat pattern near the bottom of the box, and more uniform temperatures throughout the rest of the box. The W-phase spacer bushing separating the cable termination box oil from the transformer oil was not as severely burned as the spacer bushings for the other two boxes. The W-phase spacer bushing remained in place. Transformer oil did not feed the fire via the W-phase box.
- D. Burn patterns on the transformer conservator tank indicate that it suffered more heat damage on the west end, near the W-phase cable termination box. The oil gauge was consumed by the fire on this end of the tank. Oil released from the conservator tank added more fuel to the fire.
- E. The only parts of the terminations and cables not consumed by the fire were the copper conductors, the brass termination cap, and fragments of one aluminum cap shield. One of the aluminum base flanges for the U-phase termination assembly was found mostly intact below the U-phase box. The flanges for the V and W-phase terminations were mostly found in the basement and had suffered heat and mechanical damage.
- F. Burn patterns on the U, V, and W-phase cables indicate that the W-phase cable fell into the basement early in the event and that the U and V-phase cables remained in place during part of the subsequent fire.

C2.0003



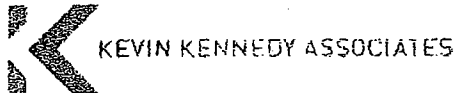
KEVIN KENNEDY ASSOCIATES

- G. U and V-phase cables and the remains of burned terminations released at the brazed connection at the top of the T-bus in the cable box. W-phase cable and termination remains released at the brazed connection at the bottom of the T-bus. This indicates that pressure from an arc forced the connection to part when the termination was expelled.
- H. On the W-phase, the mechanical connection between the brass termination cap and the spade of the mechanical connector to the T-bus had moved (slid) downward. U and V-phase components were in place. This indicates that the W-phase termination was expelled.
- I. Portions of the W-phase termination insulator¹ were found on the ground north of the W-phase cable box in large pieces. The insulator pieces that were recovered from U and V-phase were found in the basement and heavily damaged due to heat and the subsequent wet conditions. This indicates that the W-phase termination assembly was forced out of its box at an angle.
- J. The inner flange of each termination was held in place with insulated Permaglass® bolts. All 12 bolts for the W-phase termination were found after the fire. Some of the bolts were broken at the bolt shaft and some were broken in the aluminum flange threads, suggesting that the W-phase termination assembly was forced out at an angle and not burned out by the fire. Most of the bolts for U and V-phase were not found; this suggests that they were consumed in the fire.
- K. An eyewitness from his viewpoint southwest of the rectifier bays observed a bright flash at the north side of RF12 bay. This was followed by the observation of black smoke and hearing the crackling sound of burning oil. Subsequent to that, a small fire was observed that developed into a large fire. Finally, several explosions were heard. These observations are consistent with the release of burning oil in the initial fault, the release of the oil in W-phase cable box, followed by the release of oil in the U and V-phase cable boxes and, finally, release of the transformer oil fueling the fire.

Opinion #2: Electrical Fault Origin and Cause

It is our opinion, to a reasonable degree of engineering certainty, that the failure of electrical insulation within the W-phase 220000-volt termination assembly caused an arcing fault between the conductor in the termination and the earthed termination base flange, located

¹ The termination insulator is the glazed resin cone-shaped shell which physically isolates the termination components from the oil in the box and electrically insulates the energized components from the earthed base flange.



slightly below the bottom of the cable termination box. Our opinion is based primarily on our observation of an arc pattern on the copper conductor.

However, we also observed partial discharge²-caused carbon tracking (which eventually leads to an arcing fault) embedded into the internal surfaces of two surviving pieces of the termination's insulator shell, one of which came from near the bottom of the insulator at the earthed flange near the "stress cone."³ This carbon tracking is at earth potential and effectively shortens the distance along the insulator surface between the energized brass termination cap and the earthed base flange, which further elevates the electric stresses within the termination's oil, and across the insulator surface. The severity of the tracking on the insulator pieces indicates that the partial discharge activity had probably been going on for a long time.

Because the arc did not occur between the energized brass termination cap and the earthed flange, but rather through cable insulation within the termination in the area where the insulation diameter is reduced, this indicates that partial discharge activity within the termination oil over time caused excessive electric stress and tracking within the cable insulation at the faulted area. Eventually, the cable insulation and the termination oil failed to withstand the electric stress and an arc traveled from the conductor through the cable insulation and the oil to the carbon tracks embedded on the insulator, and on to the earthed base flange. Heat and pressure from the arc then broke the insulated flange bolts, or the aluminum threads within the flange, and forced the base flange away from the bottom of the cable termination box, causing a flash and the expulsion of the termination and oil from the cable termination box.

Typical reasons for the partial discharges occurring include material deformity or defect, voids, and moisture or dirt contamination in the stress cone area, or some problem with the way the semi-conducting material was removed from the cable insulation.

Bases for Opinion #2:

- A. Relay event logs and oscillograph data indicate that the electrical fault occurred on W-phase.

² Partial discharges (PD) are electric pulses on and in an insulator that stops at each current zero and doesn't complete a circuit. PD destroys some types of insulation, creates conductive and combustible gases in air or oil, causes conductive "tree-shaped" tracking paths on insulator surfaces, and creates radio frequency noise.

³ The stress cone is a cone-shaped piece of silicone rubber insulator which contains a semi-conductor strip designed to reduce the electric stress at the point where the semi-conducting layer on the cable has been removed. The stress cone is slid over the cable insulation after the semi-conducting layer is removed.



KEVIN KENNEDY ASSOCIATES

- B. The fire origin and cause investigation indicates that the W-phase termination was expelled from its box.
- C. An arc pattern is present on the W-phase 800 MCM copper conductor, about 37 cm from the bottom of the brass termination cap. This is in the area where the cable insulation is reduced to make the installation of the stress cone easier. Out of the 91 strands, 11 strands within a small, localized area in the 1st and 2nd layers were melted opened. Tiny beads of copper on the tips of melted open strands, were observed using microphotography. The small amount of copper consumed is consistent with a short time (78ms), low energy arc (6800 amperes).⁴ Although some large area melting and breaking of copper conductor strands on the other cables indicated damage from the heat of the fire, or from falling to the ground, no other arcing patterns were observed. Microscope photographs of the arc pattern are included as Attachment A to this report.
- D. Partial discharge-caused carbon tracking patterns are embedded into the internal surfaces of surviving pieces of termination insulator shell pieces which came from where the insulator is in contact with the base flange, and is near the stress cone, the area of highest electric stress in the termination. Microscope photographs of the partial discharge-caused carbon tracking are included as Attachment B to this report.
- E. Scanning Electron Microscope (SEM) analysis was conducted on one of the insulator pieces with partial discharge-caused carbon tracking. The SEM indicated that traces of aluminum were found within the track.
- F. An eyewitness from his viewpoint southwest of the rectifier bays observed a bright flash at the north side of RF12 bay, and at the same time the lights dimmed due to the electrical fault. This was followed by the observation of black smoke and hearing the crackling of burning oil. This is consistent with an arc to the termination insulator flange, which is outside of, and slightly below, the bottom of the cable termination box.
- G. An area of bunched cable strands were found on the W-phase cable. This distortion was more severe than on the U and V-phase cables, indicating that the W-phase cable was forced downward rather than just falling down.
- H. An aluminum spray pattern was observed on the inside of the W-phase cable box emanating from the area of the heat pattern at the bottom of the cable box. This is consistent with an arcing event to an earthed aluminum surface.

⁴ A 230000-volt fault in the United States generally is more than 25,000 amperes.



KEVIN KENNEDY ASSOCIATES

- I. There is no physical evidence indicating that the connectors within the boxes overheated from electrical load or parted while under load. RF12 had not been operated in excess of rated load at any time from May 2007 to December 2010.

3. RESUME AND CREDENTIALS

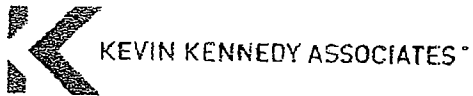
Beth Anderson and Mark Lautenschlager are licensed professional engineers. Our resumes are attached to the end of this report as Attachment C.

4. DOCUMENTS AND RESOURCES REVIEWED

Kevin Kennedy and Associates has reviewed the following documents:

- Alarm and measurement data provided by Alcoa
- Silec specifications for the installation of the terminations
- Silec engineering drawings of the terminations
- Fuji specifications for the transformer
- Inspection report of Pfisterer ESF45 Outdoor End Terminations at Alcoa Fjardaal Rectifier Group #12. Inspections occurred in November/December 2009
- Investigation Report of Oil-Gas Spacer Bushing for Rectifier RF14 dated March 10, 2009
- Photographs taken by Alcoa and other parties of the fire scene and equipment during and after the fire
- Translated eyewitness observations
- NFPA 921 Guide for Fire and Explosion Investigations, 2008 Edition
- Case Study: Lessons Learned From the Failure of a New 230-Kv Transformer Cable Termination, IEEE Electrical Insulation Magazine, January/February - Vol.26, No.1

These opinions are based on work performed to date.



Attachments

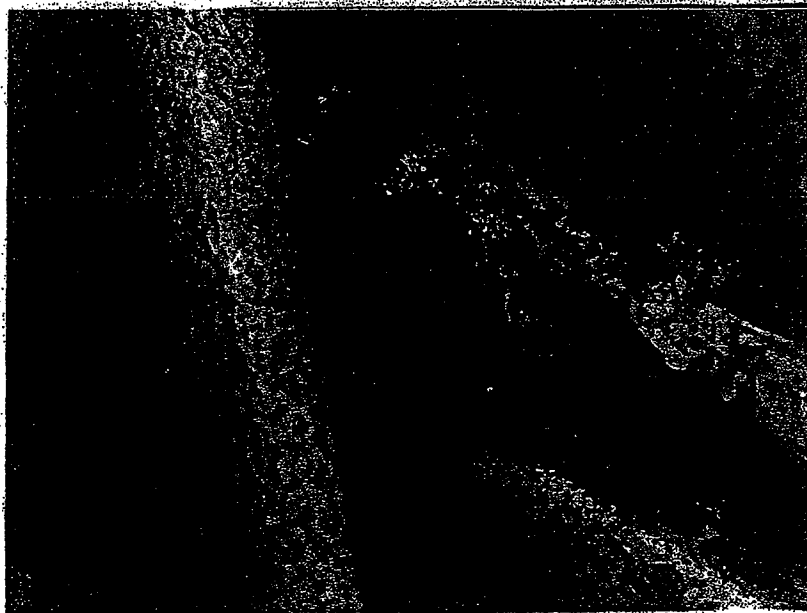
- Attachment A – Photographs
- Attachment B – Artifact #23 Photographs
- Attachment C – CV's of Beth Anderson and Mark Lautenschlager
- Attachment D – Artifact List & Diagram
- Attachment E – Photo ID's – All photos are available for FTP download upon request
- Attachment F – Diagram

Attachment A

The following photographs are of the arc pattern on W-phase cable, 37 cm below the brass termination cap (Artifact #12A). These photographs were taken with a microscope.

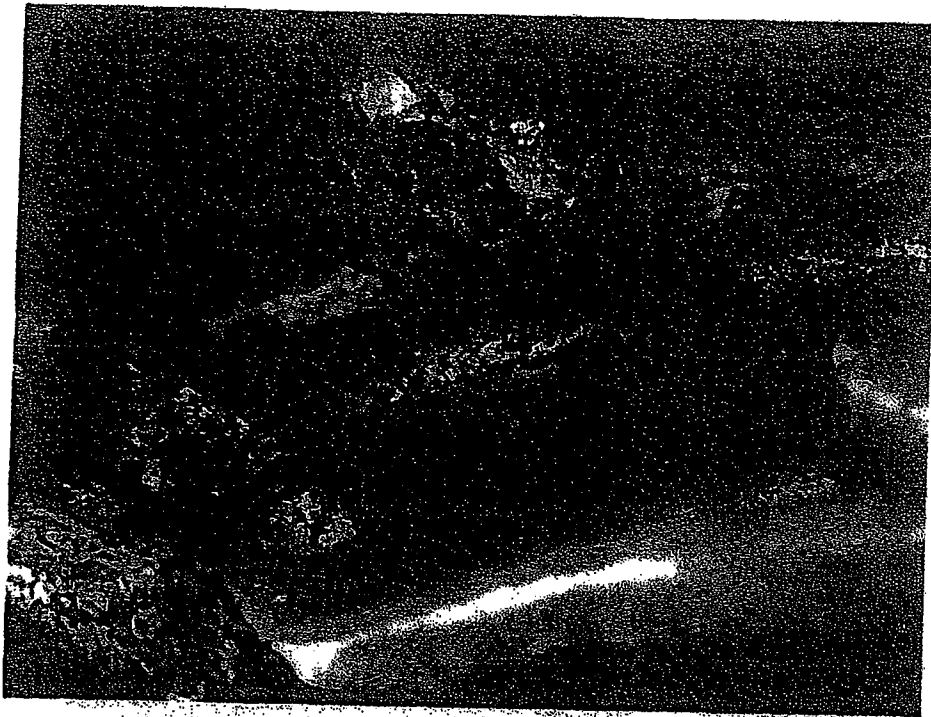


Photograph 1673



Photograph 1675.

C2.0009

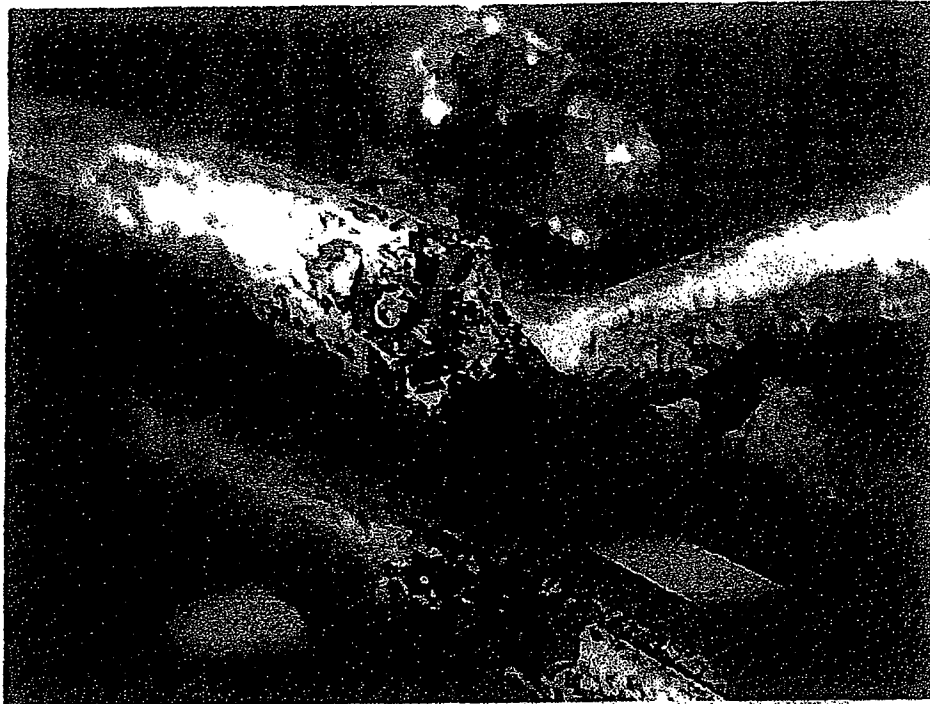


Photograph 1679.



Photograph 1682.

C2.0010



Photograph 1684.

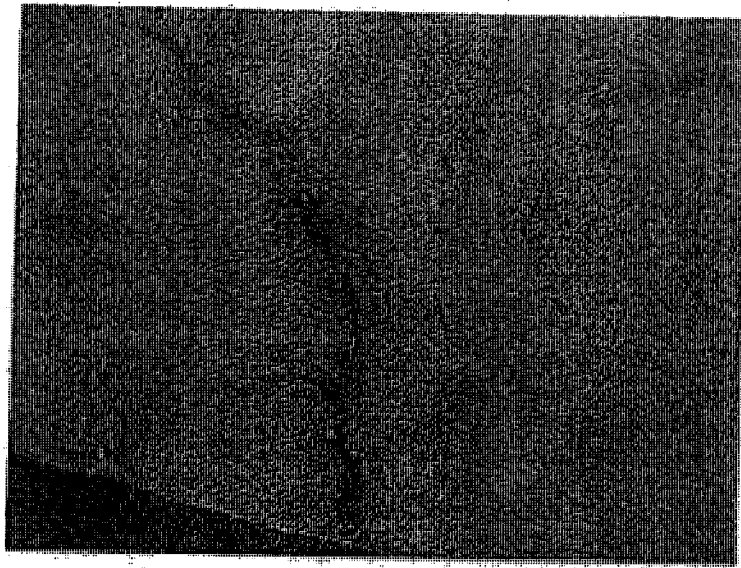


Photograph 1685.

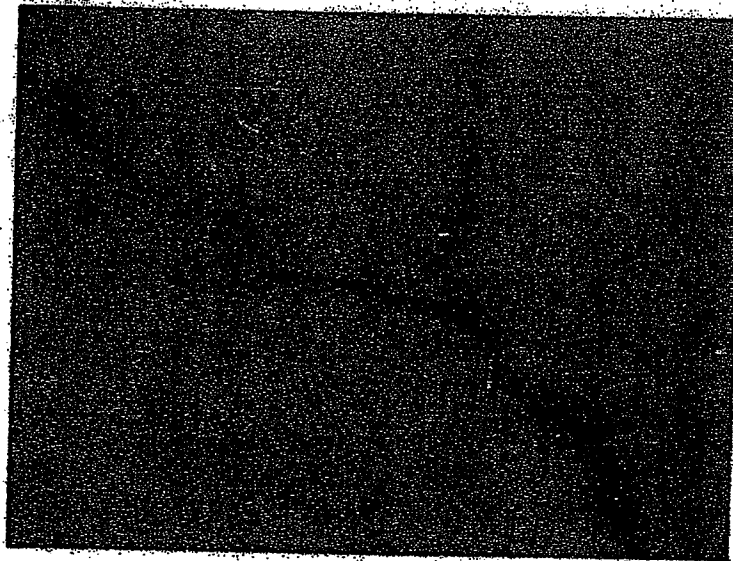
C2.0011

Attachment B

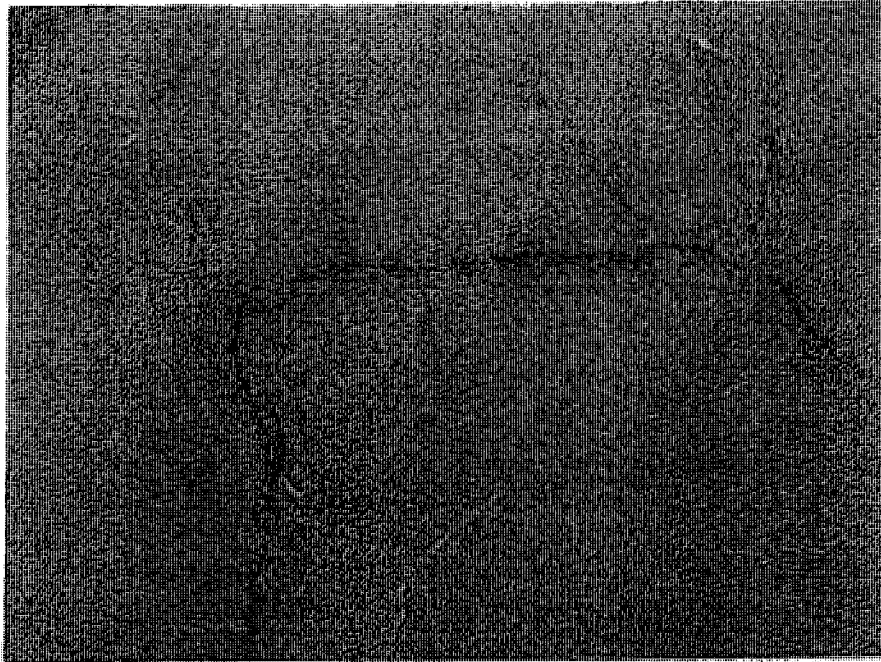
The following 4 photographs are of the insulator piece found in Artifact #23 (#23B). The piece has a curved section to it that indicates it is located at the base of the insulator. All of the partial discharge-caused tracking patterns are located on the internal surface of the insulator. These photographs were taken with a microscope.



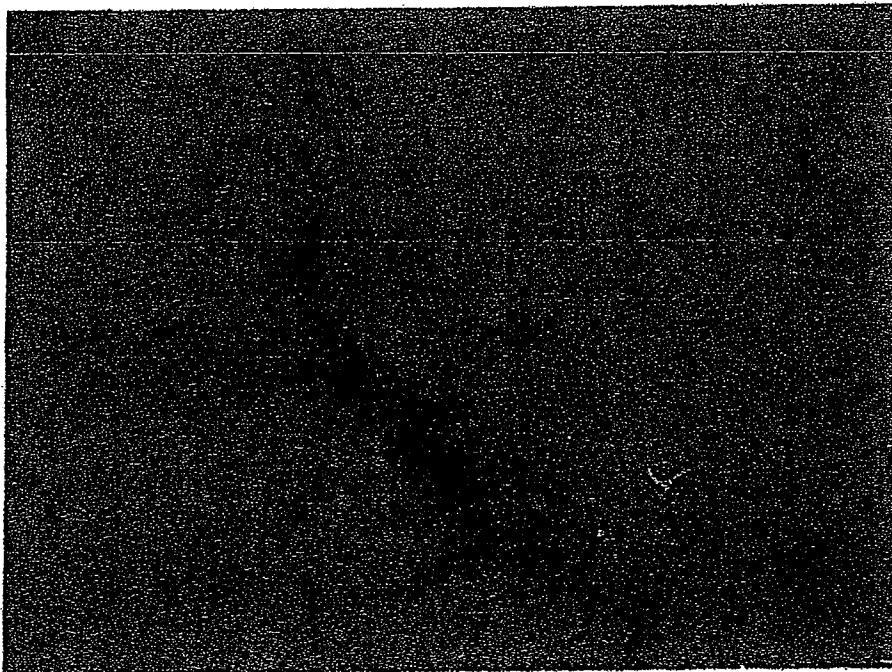
Photograph 1656.



Photograph 1657.



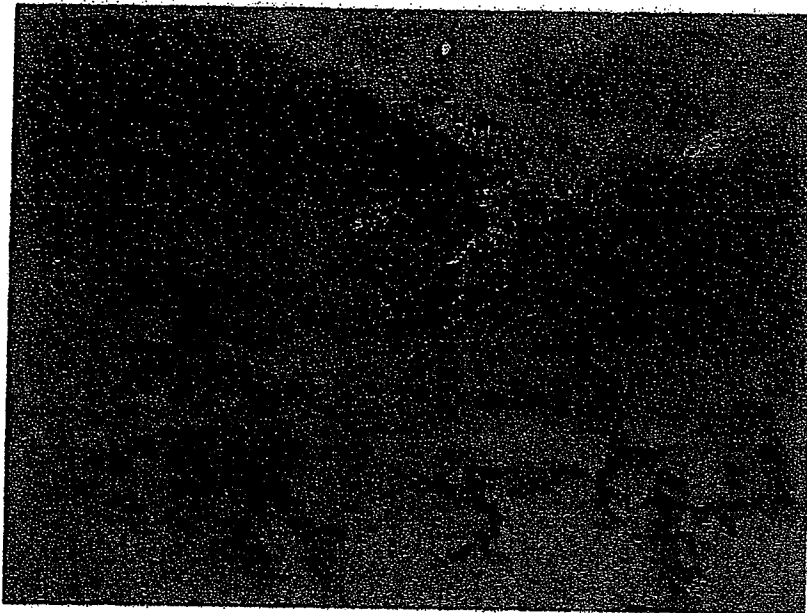
Photograph 1658.



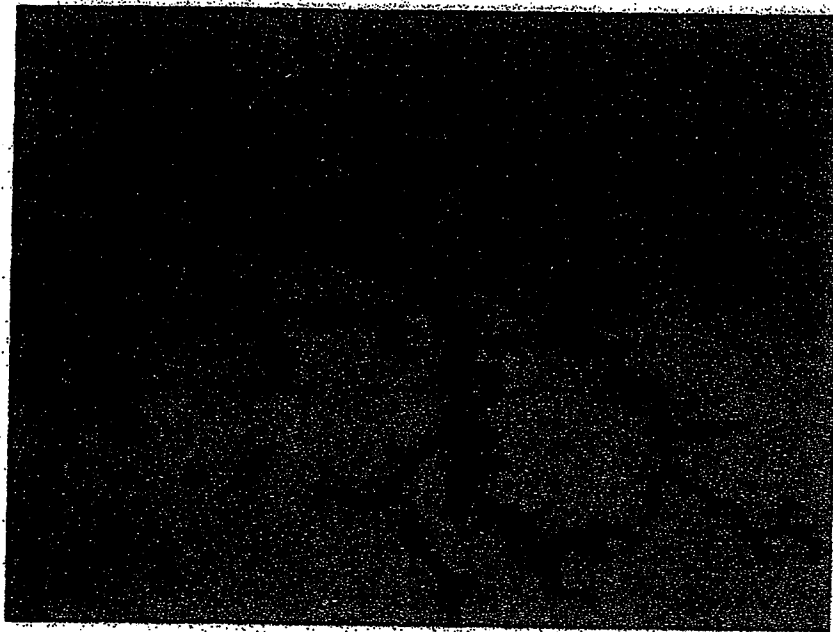
Photograph 1659.

C2.0013

The following 2 photographs are of the insulator piece found in Artifact #30 (#30A). All of the partial discharge-caused tracking patterns are located on the internal surface of the insulator. These photographs were taken with a microscope.



Photograph 1660.



Photograph 1661.



Resume of Mark Lautenschlager, P.E., Consultant

PRINCIPLE INDUSTRIES SERVED

- Electrical Power
- Industrial
- Hospital
- Government
- Electric Utilities

EDUCATION

Attended the Rose Poly Institute of Technology (now Rose-Hulman) in Terre Haute, Indiana, from August 1965 to June 1966, and transferred to Tri-State College (now Trine University) in Angola, Indiana, in January 1967. He graduated in December 1969 from Tri-State College with a Bachelor of Science degree in Electrical Engineering.

EXPERTISE AND SERVICES

This expert has experience in electrical forensic investigations, electrical power equipment testing and maintenance. Other areas of expertise for this consultant are root-cause analyses for large electrical power outages, substation equipment failures, and large transformer failures. This expert is involved with investigation of operations, maintenance, engineering, and reliability practices.

Additional experience and specialization of this expert includes OSHA and EPA compliance, installation, maintenance, and testing of industrial equipment. This expert has experience in hospital, government, and electric utility electrical power equipment. Areas of specialty for this expert include forensic investigations of electrocutions, transformer and switchgear failures, and design of control and relay circuits. This consultant's work experience includes transformer testing, transformer maintenance, and transformer surge protection. This expert has experience in the investigation of power-factor problems and transformer overheating due to improperly adjusted SCR drives. This consultant has experience in reducing short-circuit problems and ferro-resonance transformer failure. Other areas of expertise for this consultant include transformer differential protection tips, transformer degassing, removing water from transformers, and analyses of transformer failures.



PROFESSIONAL EXPERIENCE

Before and during college, worked summers and holidays on power line and substation construction crews for contractors in Indiana and Illinois, and as a junior distribution engineer for the Northern Indiana Public Service Company (NIPSCO) in Angola, Indiana.

Upon graduation, worked 5 years (December 1969 to April 1975) for the Indiana Michigan Electric (now Power) Company (part of American Electrical Power) as a substation testing engineer and as a senior relay engineer in Marion, Indiana. Led inspection, testing, maintenance, and commissioning of substation equipment, relays, and controls for equipment rated from 12000-volts to 765000-volts. He conducted distribution and transmission relay setting calculations and evaluated electrical and oil testing results. He also led the assembly, vacuum-filling, and commissioning and repair of large power transformers.

Worked 3 years (April 1975 to May 1978) for the Harza Engineering Company (now MWH Engineering) as the on-site design, construction, and commissioning engineer for a large transmission line and substation project located in the country of Iran. He conducted final electrical, relaying, and control design work, supervised the construction of the substations and the installation of equipment, tested all electrical equipment, and commissioned the four main Iranian transmission-grid 400000-volt/230000-volt substations and transmission lines for the Iranian Power Company. He conducted electrical short-circuit impedance and relay setting calculations and instructed Iranian power company employees how to operate and maintain the substations/transmission system.

Worked 20 years (May 1978 to August 1998) for the High Voltage Maintenance Corporation (HVM) as the Indiana division engineer (1978-1984), as the manager for the Dayton, Indiana, Michigan, and Missouri divisions, and as the corporate senior vice-president of engineering and operations (1984-1998). HVM became an Emerson Electric company in 1996. He also was the OSHA, EPA, and QC compliance officer. He led the installation, maintenance, and testing of industrial, hospital, government, and electric utility electrical power equipment, primarily in Indiana, Ohio, Michigan, Illinois, and Missouri. He trained electrical testing engineers and technicians for the High Voltage Maintenance Corporation, the International Electrical Testing Association, and the AVO training institute. While at HVM, conducted forensic investigations of two electrocutions, and several transformer and switchgear failures. Led the commissioning of electrical power equipment installations, including the controls and relaying for a nuclear power plant switchyard for the Consumer Power Company in Michigan. He led the assembly and commissioning of large power transformers and specified, operated, and trained



KEVIN KENNEDY ASSOCIATES

others in operating transformer vacuum-oil filling rigs. He provided technical and safety guidance for HVM's engineers and technicians. He led the maintenance, testing, rebuilding, SF6 gas recovery and refilling, and testing of High voltage SF6 circuit breakers at a power plant in Illinois, including the utilization of SF6 gas leak detection methods and determining methods for repairing SF6 gas leaks. Designed control and relay circuits, specified electrical power equipment for clients and testing equipment for HVM, and conducted short-circuit and relay setting studies for clients. Evaluated testing results, advised clients, and prepared formal equipment condition reports for clients. Developed generic electrical power equipment pre-energizing and energizing checklists for HVM's use when it was contracted to act a commissioning agent for new electrical equipment installations. He contributed to the development of a new method for reducing harmonics, which reduce energy costs, on industrial power systems.

Left HVM in August of 1998 and started Electrical Risk Consultants (ERC International, Inc.) of Apollo Beach, Florida, in January 1999. He has been working (1999-2006, 2007-present) as a senior electrical power and electrical utility consultant. He conducted electrical power equipment testing and maintenance seminars for testing company engineers and technicians, for the Center for Professional Advancement in New Jersey, and for the TUV Akademie Middle East Training Company in the country of Abu Dhabi. He developed substation testing and maintenance programs for the Alcoa Aluminum plant in Evansville, Indiana.

He was subcontracted part-time by ERC to the Liberty Consulting Group from 2000 to present as a senior consultant (about 1/2 of available time). For Liberty, he audited and evaluated distribution and transmission systems, and transmission and distribution substations, maintenance and reliability programs and performances, and investigated and conducted root-cause analyses for large electrical power outages and substation equipment failures occurring in Illinois and Nova Scotia. He also investigated the operations, maintenance, engineering, and reliability practices of Commonwealth Edison Energy (ComEd in Chicago), Nova Scotia Power, Ameren-Illinois Electric Company, Georgia Power, Alabama Power, Northwestern Energy (Montana), Central Maine Power Company, Bangor Maine Power Company, and for Cap Rock Energy in Texas. The Liberty reports on the ComEd and Ameren investigations and conclusions can be found on the Illinois Commerce Commission internet web site. In 2004, I was part of a team that conducted a justification study of three 345kV transmission lines for the Kentucky Public Service Commission. The work included verifications of appropriate use of electrical studies, considerations for alternatives routes, and the methods used for public input.



He provided consulting evaluations of a large 800-MVA transformer failure at a nuclear power plant in Florida. He continues to provide part-time consulting services for the Liberty Consulting Group for follow up of the Ameren-Illinois investigation.

Worked 9 months (November 2006-August 2007) full-time as senior consultant with the Rimkus Consulting Group in Tampa, and then part-time from August 2007 to present. He has conducted about 80 electrical forensic investigations for Rimkus. Although he prepared verbal and written expert reports for the Rimkus and Liberty investigations.

Currently conducting test technician training seminars for NETA testing companies and at the 2010 NETA Power Test Conference, as well as continuing on-going evaluations of Ameren reliability and maintenance programs.

Currently working for Kevin Kennedy Associates in Indianapolis, IN providing expertise in electrical forensic investigations, electrical power equipment testing and maintenance, root-cause analyses for large electrical power outages and substation equipment failures, large transformer failures, and related expertise to a wide variety of clients.

PUBLICATIONS

In miscellaneous magazines

Electrical Construction and Maintenance magazine, June, 1980, "A discussion of current transformer testing"

Electrical Construction and Maintenance magazine, August, 1981, "Testing protective relay circuits"

Pulp & Paper magazine, December 1982 "Transformer maintenance and testing guide"

Facilities Management Operations and Engineering magazine, January, 1985,

"Preventive maintenance and testing of electrical systems"

In NETA World magazine

Spring 1994, "Measuring turns ratios involving WYE windings with inaccessible neutrals"

Summer 1994, "Understanding negative power factors"

Fall 1994, "Can water enter a nitrogen-blanketed transformer under pressure?"

Summer 1995, "What to do when two buses are 60-degrees out of phase"

Fall 1995, "Protect transformers with surge protectors"

Winter 1995, "Purpose of transformer nitrogen blankets and conservators"

Summer 1996, "Power-factor problems"



KEVIN KENNEDY ASSOCIATES

Fall 1996, "Transformer overheating due to improperly adjusted SCR drives"
Winter 1996, "Reducing short-circuit problems"
Summer 1997, "Keep water and air out of transformers"
Fall 1997, "Ferro-resonance can cause transformers to fail"
Winter 1997, "Protect transformers with surge protectors"
Spring 1998, "Transformer differential protection tips"
Summer 1998, "Don't sample Askeral"
Fall 1998, "Corona, Is there anything good about it?"
Winter 1998, "Transformer degassing to remove combustible gases"
Spring 1999, "Rules for removing water from transformers"
Fall 1999, "Analyses of transformer failures"
Winter 1999, "The mystery of transformers"
Spring 2000, "Guidelines for selecting no-load taps on power transformers"
Summer 2000, "A guide for paralleling electrical systems"
Winter 2000, "Transformer failure data"
Summer 2008, "A guide to paralleling electrical systems,"
Spring 2010, "Using Root-Cause Analysis to find underlying causes of bad situations"

AFFILIATIONS

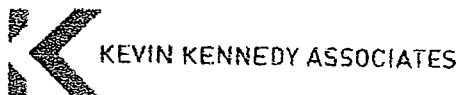
A member of the International Electrical Testing Association (NETA) board of directors from 2005 to 2008, president of NETA for 2007 and 2008, and was a member of the NETA technical standards committee from 2004 through 1998. In 2000, led the NETA review committee for the acceptance of the NETA transformer acceptance testing standards by the Ameren National Standards Institute (ANSI). He was the NETA annual technical conference papers chairperson from 1993 through 1997.

NETA Man of the Year in 1995 and awarded lifetime NETA affiliate membership.

Member of the Institute of Electrical and Electronics Engineers (IEEE).

REGISTRATIONS

He is a registered professional engineer in Indiana, Florida, and Pennsylvania.
Indiana # PE10606492,
Florida # 65822,
Pennsylvania # PE-043993-R



Resume of BETH I. ANDERSON, Consultant

PRINCIPAL INDUSTRIES SERVED

- Fire and Arson Investigation
- Electrical/electronics

EDUCATION

M.S. in Electrical Engineering,
University of Wisconsin, Madison, WI.
Thesis: "Sound Transmission as a Means of Communicating through Earth", 1984

B.S. in Electrical and Electronic Engineering,
North Dakota State University, Fargo, North Dakota.
Minor: Technical Journalism, 1983

OTHER EDUCATION

Respirator Fit Testing, 09/08

Completed Minnesota IAAI Fire Investigation Conference, 3/28/07 - 3/30/07

IL Chapter IAAI Conference, 09/11/06-09/12/06

Minnesota Society of Professional Engineers Leadership Institute, 9/21/05,
10/20/05, 1/12/06, 5/04/06, 06/27/07

Kane County Task Force, 1/05

Completed Courses Sponsored by RedVector:

Basic Electricity I, 5/4/04

Economic Conductor, 5/11/04

Electric Motors, 5/22/04

National Electrical Code Grounding, 6/8/04

Statistical Analysis, 6/8/04

Fuel Cell Power Systems, 6/9/04

Engineering Economic Analysis, 6/9/04

Voltage Regulator Application, 10/18/05



Industrial and Outdoor Lighting, 10/18/05
Renewable Energy Generation, 10/18/05

Orland Park Fire Department Seminar, Illinois Instructor "Electrical Appliance Fires", 4/03

Attended Fire Investigation Conference Minnesota Chapter IAAI, 3/02

IL Chapter IAAI Fire Investigation Seminar, Instructor "Electrical Fires", 9/01

Minnesota Institute of Legal Education (MILE) FIRE Seminar Instructor "Electrical Fires," 3/01

Completed Electrical Safe Work Practices Course Minnesota Safety Council, 1/23/01 – 1/24/01

Completed 2000 Fire Investigation Conference Minnesota Chapter IAAI, 3/22/00 – 3/24/00

Minnesota Institute of Legal Education (MILE) FIRE Seminar Instructor "What Every Attorney Should Know", 2/00

IL-Chapter IAAI Fire Investigation Conference, Instructor - Forensic Electrical Engineering Principles and Practices, 9/99

Completed 1999 Fire Investigation Conference Minnesota Chapter IAAI, 3/99.

Completed Anatomy of Fire Litigation Conference, Sponsored by Minnesota Institute of Legal Education, 2/98.

Completed AC Machine Design Course, University of Wisconsin-Madison, 8/96.

Completed NFPA National Electrical Code Workshop, 10/94.

Completed 43rd Annual IAAI Arson Seminar, Hosted by Minnesota Chapter of IAAI, 5/92.

Completed Electrical Fires Accidental and Deliberate, Sponsored by Georgia Chapter of IAAI, 12/91.



KEVIN KENNEDY ASSOCIATES

Completed Fire and Arson Investigation Conference, Minnesota International Association of Arson Investigators, 3/91, 3/90, 3/89.

Completed Power Line Problems in Industrial Environments Seminar, University of Wisconsin-Madison, 11/89.

Completed Grounding of Electrical Distribution Systems Seminar, University of Wisconsin-Madison, 6/89.

Completed Fire and Arson Investigation Course, Annual Nebraska State Fire and Arson Investigators Conference, 10/87.

Completed Certificate in Management Program, Marquette University, Milwaukee, WI, 6/85.

EXPERTISE AND SERVICES

This expert specializes in design, manufacture, and quality control engineering of current transformers, product testing, fire investigation, and failure analysis.

Additional areas of experience include operation, maintenance, and repair of aircraft Inertial Navigation Systems (INS). Further expertise includes writing operation, maintenance and repair manuals, teaching electrical engineering labs, and research and design. Other related areas of expertise include electrical drafting, maintenance data collection, and communication system analysis.

This expert has over 15 years experience providing expert testimony in depositions and trials with experience in preparing case material for product liability suits, electrical code research, deposition summaries, and accident reconstruction.

PROFESSIONAL EXPERIENCE

Consultant, Kevin Kennedy Associates, Indianapolis, IN, Present

Providing electrical engineering, fire and arson investigation consulting, electronics failure analysis, electrical fire investigation, failure analysis, forensic engineering and related expertise to a wide variety of clients.

Midwest Current Transformer, Division of Anderson Engineering of New Prague, Inc., New Prague, MN, 9/92 to present



KEVIN KENNEDY ASSOCIATES

Design, manufacture, and quality control engineer of current transformers.

**Electrical Engineer, Anderson Engineering of New Prague, Inc., New Prague, MN.
4/87 to present.**

Responsible to client for engineering services including product testing, fire investigation, and failure analysis.

Customer Service Engineer Delco Systems Operation, Milwaukee, WI, 1/85 - 4/87
Responsible for training customers in the operation, maintenance, and repair of aircraft Inertial Navigation Systems (INS). Duties included design and maintenance of INS test equipment. Technical Publications responsibilities included writing operation, maintenance, and repair manuals for INS test equipment.

Teaching Assistant, University of Wisconsin, Madison, WI, 8/84 - 12/84
Responsible for teaching beginning electrical engineering labs to both EE students and non-majors. Duties included lecture and lab instruction.

Research/Development Engineer, O.S. Anderson Engineering, Inc., New Prague, MN, 5/84 - 8/84

Responsible for the research and design of a communication device used to communicate through earth.

**Assistant Engineer, O.S. Anderson Engineering, Inc., New Prague, MN, 6/83 - 9/83,
6/82 - 9/82**

Responsible for preparing case material for product liability suits. Duties included electrical code research, deposition summaries, and accident reconstruction.

Engineering Intern, Eveleth Mines, Eveleth, MN, 6/81 - 9/81

Responsibilities included electrical drafting, maintenance data collection, and communication system analysis.

AFFILIATIONS

Member Institute of Electrical and Electronic Engineers.

Member National Fire Protection Association.

Member National Society of Professional Engineers.

Member Minnesota Society of Professional Engineers.

Member Sigma Delta Epsilon, Graduate Women in Science.

Member American Academy of Forensic Sciences.



KEVIN KENNEDY ASSOCIATES

REGISTRATIONS

Licensed Professional Engineer:

State of Minnesota, 1987

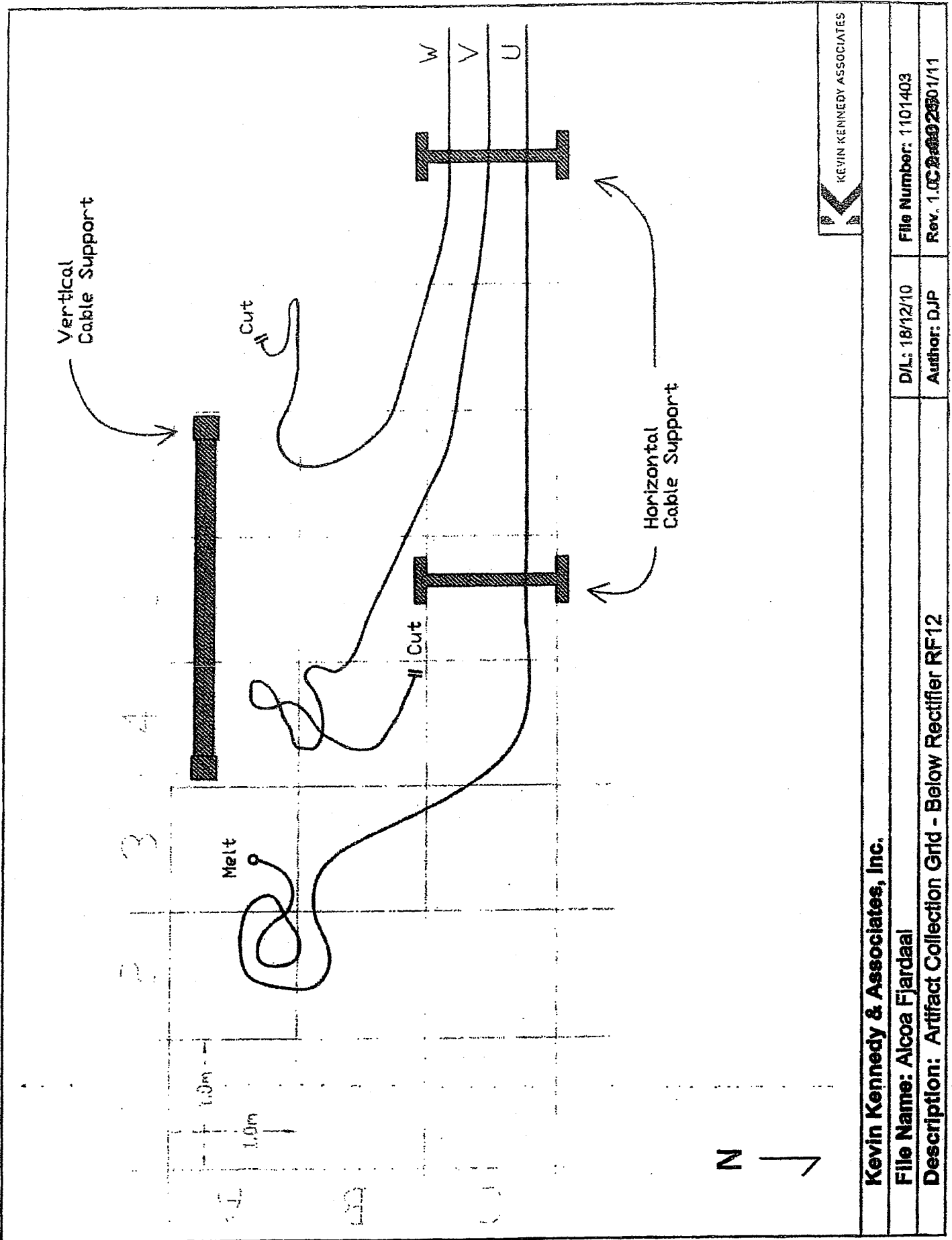
State of Wisconsin, 1986

State of Illinois, 1999

State of Arizona, 2003

State of Iowa, 2009

State of Indiana, 2009





KEVIN KENNEDY ASSOCIATES

Artifact List

Page 1 of 4
Thursday, 17 February, 2011

File Number: 11010403 Date of Loss: 18/12/2010 Engineer(s): BIA

File Name: ALCOA FJARDAAL

Item No.	Date Found	By	Description	Location Found
1	17/01/11	BIA	U-Phase - Termination	Warehouse
1A	11/02/11	BIA	U-Phase - T-bus and termination lead	Artifact #1
1B	11/02/11	BIA	U-Phase - Cable	Artifact #1
1C	11/02/11	BIA	U-Phase - Blocking and bolts	Artifact #1
1D	11/02/11	BIA	U-Phase - Insulator metal tube	Artifact #1
2	17/01/11	BIA	U-Phase - Termination flange	Warehouse
3	17/01/11	BIA	U-Phase - Shield	Warehouse
4	17/01/11	BIA	U-Phase - Debris from inside cable box	Warehouse
4A	11/02/11	BIA	U-Phase - Bolt	Artifact #4
5	17/01/11	BIA	U-Phase - Primary bushing to transformer	Warehouse
6	17/01/11	BIA	U-Phase - Metal debris from inside cable box	Warehouse
7	17/01/11	BIA	V-Phase - Termination - Load side	Warehouse
8	17/01/11	BIA	V-Phase - Termination - Line side	Warehouse
8A	11/02/11	BIA	V-Phase - Debris	Artifact #8
8B	11/02/11	BIA	V-Phase - Cable	Artifact #8
8C	11/02/11	BIA	V-Phase - Termination housing and stress cone	Artifact #8
8D	11/02/11	BIA	V-Phase - Insulator metal tube	Artifact #8
9	17/01/11	BIA	V-Phase - Debris from cable box	Warehouse
9A	11/02/11	BIA	V-Phase - Fiber bolts and components	Artifact #9
10	17/01/11	BIA	V-Phase - Metal pieces from cable box	Warehouse
11	17/01/11	BIA	V-Phase - Primary bushing to transformer	Warehouse
11A	11/02/11	BIA	V-Phase - T bar	Artifact #11
12	17/01/11	BIA	W-Phase - Termination	Warehouse
12A	11/02/11	BIA	W-Phase - Cable	Artifact #12
12B	11/02/11	BIA	W-Phase - Termination housing	Artifact #12
12C	11/02/11	BIA	W-Phase - Blocking and bolts	Artifact #12
12D	11/02/11	BIA	W-Phase - Insulator metal tube	Artifact #12
13	17/01/11	BIA	W-Phase - Debris from cable box	Warehouse
14	17/01/11	BIA	W-Phase - T-bus from cable box	Warehouse
14A	11/02/11	BIA	W-Phase - Paper debris	Artifact #14
15	17/01/11	BIA	W-Phase - Pressure relief found inside cable box	Warehouse

C2.0026



KEVIN KENNEDY ASSOCIATES

Artifact List

Page 2 of 4
Thursday, 17 February, 2011

File Number: 11010403 **Date of Loss:** 12/18/2010 **Engineer(s):** BIA

File Name: ALCOA FIARDAAL

Item No.	Date Found	By	Description	Location Found
16	18/01/11	BIA	Components and debris	Grid 3A
16A	11/02/11	BIA	Bolts, hardware, and insulator	Artifact #16
17	18/01/11	BIA	Components and debris	Grid 3B
17A	11/02/11	BIA	Insulator pieces	Artifact #17
18	18/01/11	BIA	Components and debris	Grid 4A
18A	11/02/11	BIA	Bolts, hardware, and insulator	Artifact #18
18B	11/02/11	BIA	Termination ground connection	Artifact #18
19	18/01/11	BIA	Components and debris	Grid 4A
20	18/01/11	BIA	Conductors	Grid 4A
21	18/01/11	BIA	Components and debris	Grid 4B
21A	11/02/11	BIA	Aluminum pieces	Artifact #21
21B	11/02/11	BIA	Bolts and hardware	Artifact #21
21C	11/02/11	BIA	Cable ground shield connection, and lower housing	Artifact #21
22	18/01/11	BIA	Components and debris	Grid 4B
23	18/01/11	BIA	Components and debris	Grid 5A
23A	11/02/11	BIA	Oil purge from back of cable box	Artifact #23
23B	11/02/11	BIA	Insulator piece with tree marks	Artifact #23
23C	11/02/11	BIA	Variable resistor components	Artifact #23
23D	11/02/11	BIA	Bolt and hardware	Artifact #23
23E	11/02/11	BIA	Aluminum pieces	Artifact #23
24	18/01/11	BIA	Components and debris	Grid 5A
24A	11/02/11	BIA	Aluminum pieces, bolts, and hardware	Artifact #24
24B	11/02/11	BIA	Bolts, hardware, and ground braid	Artifact #24
24C	11/02/11	BIA	Aluminum pieces	Artifact #24
24D	11/02/11	BIA	Aluminum pieces	Artifact #24
25	18/01/11	BIA	Concrete and components	Grid 5A
25A	11/02/11	BIA	Aluminum pieces and bolt	Artifact #25
26	18/01/11	BIA	Components and debris	Grid 5B
26A	11/02/11	BIA	Bolts, burned insulator, hardware	Artifact #26
27	18/01/11	BIA	Components and debris	Grid 5B

C2.0027



Artifact List

Page 3 of 4
Thursday, 17 February, 2011

File Number: 11010403 **Date of Loss:** 12/18/2010 **Engineer(s):** BIA

File Name: ALCOA FJARDAL

Item No.	Date Found	By	Description	Location Found
28	18/01/11	BIA	Conductors	Grids 5A, 5B, 6A, 6B
28A	11/02/11	BIA	Ground circuit w/melted end	Artifact #28
29	18/01/11	BIA	Components and debris	Grid 6A
29A	11/02/11	BIA	Termination components	Artifact #29
29B	11/02/11	BIA	Bolts and hardware	Artifact #29
30	18/01/11	BIA	Components and debris	Grid 6B
30A	11/02/11	BIA	Insulator piece with tree marks	Artifact #30
30B	11/02/11	BIA	Insulator pieces	Artifact #30
30C	11/02/11	BIA	Nonmetallic pieces	Artifact #30
30D	11/02/11	BIA	Aluminum pieces	Artifact #30
30E	11/02/11	BIA	Bolts and hardware	Artifact #30
30F	11/02/11	BIA	Variable resistor	Artifact #30
30G	11/02/11	BIA	Silicon block and semiconductor	Artifact #30
31	18/01/11	BIA	Components and debris	Grid 6B
32	18/01/11	BIA	W-Phase - Debris from cable box, between primary bushing and transformer	Warehouse
33	19/01/11	BIA	Components and debris	Grid 7B
33A	11/02/11	BIA	Aluminum pieces	Artifact #33
33B	11/02/11	BIA	Bolts and hardware	Artifact #33
33C	11/02/11	BIA	Insulator pieces - burned	Artifact #33
33D	11/02/11	BIA	Ground connection	Artifact #33
34	19/01/11	BIA	Components and debris	Grid 7A
34A	11/02/11	BIA	Termination components	Artifact #34
35	19/01/11	BIA	Components and debris	Grid 8A
36	19/01/11	BIA	Components	Grid 7C
37	19/01/11	BIA	Components and debris	Grids 4C, 5C
38	19/01/11	BIA	Components and debris	Grid 8B
39	19/01/11	BIA	Components and debris	Grid 6C
40	19/01/11	BIA	W-Phase - Termination components	Ground level near W-Phase
41	19/01/11	BIA	Components	Ground level near W-Phase
41A	11/02/11	BIA	Bolts and hardware	Artifact #41

C2.0028



KEVIN KENNEDY ASSOCIATES

Artifact List

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Thursday, 17 February, 2011

File Number: 11010403 **Date of Loss:** 12/18/2010 **Engineer(s):** BIA

File Name: ALCOA FJARDAAL

Item No.	Date Found	By	Description	Location Found
41B	11/02/11	BIA	Aluminum pieces	Artifact #41
42	19/01/11	BIA	Components	Ground level near U-Phase
42A	11/02/11	BIA	Insulator and aluminum pieces	Artifact #42
42B	11/02/11	BIA	Bolts, hardware, meter, and top housing	Artifact #41
43	19/01/11	BIA	W-Phase - Primary bushing	Between transformer and cable box
44	11/02/11	BIA	Exemplar permaglass bolt -- thread stress test	-
45	11/02/11	BIA	Exemplar permaglass bolt -- stress test	-

C2.0029

2011005 Digital Photographs		
Photo #	Photograph Description	Date Taken
1	U-phase termination components.	1/11/11
2	U-phase termination components.	1/11/11
3	U-phase termination components.	1/11/11
4	U-phase termination components.	1/11/11
5	U-phase termination components.	1/11/11
6	U-phase termination components.	1/11/11
7	U-phase termination components.	1/11/11
8	U-phase termination components.	1/11/11
9	U-phase termination components.	1/11/11
10	U-phase termination components.	1/11/11
11	U-phase termination components.	1/11/11
12	U-phase termination components.	1/11/11
13	U-phase cable box.	1/11/11
14	U-phase cable box.	1/11/11
15	No flash.	1/11/11
16	U-phase cable end.	1/11/11
17	U-phase cable end.	1/11/11
18	V-phase termination components.	1/11/11
19	V-phase termination components.	1/11/11
20	V-phase termination components.	1/11/11
21	V-phase termination components.	1/11/11
22	V-phase termination components.	1/11/11
23	V-phase termination components.	1/11/11
24	V-phase termination components.	1/11/11
25	V-phase termination components.	1/11/11
26	V-phase termination components.	1/11/11
27	V-phase termination components.	1/11/11
28	V-phase termination components.	1/11/11
29	V-phase termination components.	1/11/11
30	V-phase termination components.	1/11/11
31	V-phase termination components.	1/11/11
32	V-phase termination components.	1/11/11
33	V-phase termination components.	1/11/11
34	V-phase cable box.	1/11/11
35	V-phase cable box.	1/11/11
36	V-phase cable box.	1/11/11
37	V-phase cable box.	1/11/11
38	V-phase cable box.	1/11/11
39	V-phase cable box.	1/11/11

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40	W-phase termination components.	1/11/11
41	W-phase termination components.	1/11/11
42	W-phase termination components.	1/11/11
43	W-phase termination components.	1/11/11
44	W-phase termination components.	1/11/11
45	W-phase termination components.	1/11/11
46	W-phase cable box.	1/11/11
47	W-phase cable box.	1/11/11
48	W-phase cable box.	1/11/11
49	W-phase cable box.	1/11/11
50	W-phase cable box.	1/11/11
51	Harmonic filters.	1/12/11
52	Harmonic filters and GIS building.	1/12/11
53	GIS building.	1/12/11
54	Rectifier bays.	1/12/11
55	GIS building, interior.	1/12/11
56	GIS building interior.	1/12/11
57	RF12, exterior views.	1/12/11
58	Beth Anderson and Mark Lautenschlager at RF12.	1/12/11
59	Beth Anderson and Mark Lautenschlager at RF12.	1/12/11
60	RF12, exterior views.	1/12/11
61	RF12, exterior views.	1/12/11
62	RF12, exterior views.	1/12/11
63	RF12, exterior views.	1/12/11
64	RF12, exterior views.	1/12/11
65	RF12, exterior views.	1/12/11
66	RF12, exterior views.	1/12/11
67	RF12, exterior views.	1/12/11
68	RF12, exterior views.	1/12/11
69	RF12, exterior views.	1/12/11
70	RF12, exterior views.	1/12/11
71	RF12, exterior views.	1/12/11
72	RF12, exterior views.	1/12/11
73	RF12, exterior views.	1/12/11
74	RF12, exterior views.	1/12/11
75	RF12, exterior views.	1/12/11
76	RF12, exterior views.	1/12/11
77	RF12, exterior views.	1/12/11
78	RF12, exterior views.	1/12/11
79	RF12, exterior views.	1/12/11
80	RF12, exterior views.	1/12/11
81	RF12, exterior views.	1/12/11
82	RF12, exterior views.	1/12/11

83	RF12, exterior views.	1/12/11
84	RF12, exterior views.	1/12/11
85	RF12, exterior views.	1/12/11
86	RF12, exterior views.	1/12/11
87	RF12, exterior views.	1/12/11
88	RF12, exterior views.	1/12/11
89	RF12, exterior views.	1/12/11
90	RF12, exterior views.	1/12/11
91	RF12, exterior views.	1/12/11
92	RF12, exterior views.	1/12/11
93	RF12, exterior views.	1/12/11
94	RF12, transformer conservator tank supports on west end.	1/12/11
95	RF12, exterior views.	1/12/11
96	RF12, exterior views.	1/12/11
97	RF12, exterior views.	1/12/11
98	RF12, exterior views.	1/12/11
99	RF12, transformer conservator tank.	1/12/11
100	RF12, transformer conservator tank.	1/12/11
101	RF12, transformer conservator tank.	1/12/11
102	RF12, transformer conservator tank.	1/12/11
103	RF12, transformer conservator tank.	1/12/11
104	RF12, transformer conservator tank.	1/12/11
105	RF12, transformer conservator tank.	1/12/11
106	RF12, transformer conservator tank.	1/12/11
107	RF12, top of regulating transformer.	1/12/11
108	RF12, transformer conservator tank.	1/12/11
109	RF12, transformer conservator tank.	1/12/11
110	RF12, transformer conservator tank.	1/12/11
111	RF12, transformer conservator tank.	1/12/11
112	RF12, transformer conservator tank.	1/12/11
113	RF12, transformer conservator tank.	1/12/11
114	RF12, transformer conservator tank.	1/12/11
115	RF12, transformer conservator tank.	1/12/11
116	RF12, transformer conservator tank.	1/12/11
117	RF12, transformer conservator tank.	1/12/11
118	RF12, exterior views.	1/12/11
119	RF12, exterior views.	1/12/11
120	RF12, exterior views.	1/12/11
121	RF12, exterior views.	1/12/11
122	RF12, exterior views.	1/12/11
123	RF12, exterior views.	1/12/11
124	RF12, exterior views.	1/12/11
125	RF11, exterior views.	1/12/11

126	RF11, exterior views.	1/12/11
127	RF11, exterior views.	1/12/11
128	RF11, exterior views.	1/12/11
129	RF11, exterior views.	1/12/11
130	RF13, exterior views.	1/12/11
131	RF13, exterior views.	1/12/11
132	RF13, exterior views.	1/12/11
133	RF13, exterior views.	1/12/11
134	RF13, exterior views.	1/12/11
135	RF13, exterior views.	1/12/11
136	Harmonic filters.	1/12/11
137	Harmonic filters.	1/12/11
138	Incoming 220 kV power lines.	1/12/11
139	Not in focus.	1/12/11
140	Incoming 220 kV power lines.	1/12/11
141	RF12, 33kV terminations.	1/12/11
142	RF12, cables to basement.	1/12/11
143	RF12, exterior views.	1/12/11
144	RF12, exterior views.	1/12/11
145	No flash.	1/12/11
146	No flash.	1/12/11
147	RF13, exterior views.	1/12/11
148	Not in focus.	1/12/11
149	RF13, exterior views.	1/12/11
150	RF13, exterior views.	1/12/11
151	RF13, exterior views.	1/12/11
152	RF13, exterior views.	1/12/11
153	RF12, 220kV cables under GIS building.	1/12/11
154	RF12, 220kV cables under GIS building.	1/12/11
155	RF12, 220kV cables under GIS building.	1/12/11
156	RF12, 220kV cables under GIS building.	1/12/11
157	RF12, 220kV cables under GIS building.	1/12/11
158	Mark Lautenschlager and Beth Anderson in GIS building.	1/12/11
159	Mark Lautenschlager and Beth Anderson in GIS building.	1/12/11
160	Basement under RF12.	1/12/11
161	Basement under RF12.	1/12/11
162	Basement under RF12.	1/12/11
163	Basement under RF12.	1/12/11
164	Basement under RF12.	1/12/11
165	Basement under RF12.	1/12/11
166	Basement under RF12.	1/12/11
167	Basement under RF12.	1/12/11
168	Basement under RF12.	1/12/11

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169	Basement under RF12.	1/12/11
170	Basement under RF12.	1/12/11
171	Basement under RF12.	1/12/11
172	Basement under RF12.	1/12/11
173	Basement under RF12.	1/12/11
174	Basement under RF12.	1/12/11
175	W-phase cable in basement.	1/12/11
176	W-phase cable in basement.	1/12/11
177	W-phase cable in basement.	1/12/11
178	220 kV cable in basement.	1/12/11
179	220 kV cable in basement.	1/12/11
180	W-phase cable in basement.	1/12/11
181	W-phase cable in basement.	1/12/11
182	220 kV cable in basement.	1/12/11
183	220 kV cable in basement.	1/12/11
184	220 kV cable in basement.	1/12/11
185	220 kV cable in basement.	1/12/11
186	Flange component in basement.	1/12/11
187	Flange component in basement.	1/12/11
188	Flange component in basement.	1/12/11
189	Flange component in basement.	1/12/11
190	Deflector block in basement.	1/12/11
191	Deflector block in basement.	1/12/11
192	Deflector block in basement.	1/12/11
193	Flange components in basement.	1/12/11
194	U-phase cable in basement.	1/12/11
195	U-phase cable in basement.	1/12/11
196	U-phase cable in basement.	1/12/11
197	U-phase cable in basement.	1/12/11
198	U-phase cable in basement.	1/12/11
199	U-phase cable in basement.	1/12/11
200	U-phase cable in basement.	1/12/11
201	U-phase cable in basement.	1/12/11
202	Basement under RF12.	1/12/11
203	Basement under RF12.	1/12/11
204	220 kV cable in basement.	1/12/11
205	Components in basement.	1/12/11
206	Components in basement.	1/12/11
207	220 kV cable in basement.	1/12/11
208	Components in basement.	1/12/11
209	Components in basement.	1/12/11
210	Components in basement.	1/12/11
211	Components in basement.	1/12/11

212	Ground connection in basement.	1/12/11
213	Ground connection in basement.	1/12/11
214	Ground connection in basement.	1/12/11
215	Insulator components in basement.	1/12/11
216	Insulator components in basement.	1/12/11
217	Insulator components in basement.	1/12/11
218	Permaglass bolts in basement.	1/12/11
219	Permaglass bolts in basement.	1/12/11
220	Conductor on cable support structure.	1/12/11
221	Cable support structure.	1/12/11
222	Cable support structure.	1/12/11
223	Ladder to cable boxes.	1/12/11
224	Ladder to cable boxes.	1/12/11
225	Pattern near W-phase.	1/12/11
226	W-phase termination, blocking moved.	1/13/11
227	W-phase termination, blocking moved.	1/13/11
228	W-phase termination, blocking moved.	1/13/11
229	W-phase termination.	1/13/11
230	W-phase termination.	1/13/11
231	W-phase termination.	1/13/11
232	W-phase termination, braised connection to T-bus.	1/13/11
233	W-phase termination, braised connection to T-bus.	1/13/11
234	W-phase termination, braised connection to T-bus.	1/13/11
235	W-phase termination.	1/13/11
236	W-phase termination.	1/13/11
237	W-phase termination.	1/13/11
238	W-phase termination.	1/13/11
239	W-phase termination.	1/13/11
240	W-phase termination.	1/13/11
241	W-phase cable.	1/13/11
242	W-phase cable.	1/13/11
243	W-phase cable.	1/13/11
244	W-phase cable.	1/13/11
245	W-phase cable.	1/13/11
246	W-phase cable.	1/13/11
247	W-phase cable.	1/13/11
248	W-phase cable.	1/13/11
249	W-phase cable.	1/13/11
250	W-phase cable.	1/13/11
251	W-phase cable.	1/13/11
252	W-phase cable.	1/13/11
253	W-phase cable.	1/13/11
254	W-phase cable.	1/13/11

255	W-phase cable.	1/13/11
256	W-phase cable.	1/13/11
257	W-phase cable.	1/13/11
258	W-phase cable.	1/13/11
259	W-phase cable box.	1/13/11
260	W-phase cable box.	1/13/11
261	W-phase cable box.	1/13/11
262	W-phase cable box.	1/13/11
263	W-phase cable box.	1/13/11
264	W-phase cable box.	1/13/11
265	W-phase cable box.	1/13/11
266	W-phase cable box.	1/13/11
267	W-phase cable box.	1/13/11
268	W-phase cable box.	1/13/11
269	W-phase cable box.	1/13/11
270	W-phase cable box.	1/13/11
271	W-phase cable box.	1/13/11
272	W-phase cable box.	1/13/11
273	W-phase cable box.	1/13/11
274	W-phase primary bushing.	1/13/11
275	W-phase primary bushing.	1/13/11
276	W-phase primary bushing.	1/13/11
277	W-phase arc pattern on cable, 37 cm.	1/13/11
278	W-phase arc pattern on cable, 37 cm.	1/13/11
279	W-phase arc pattern on cable, 37 cm.	1/13/11
280	W-phase arc pattern on cable, 37 cm.	1/13/11
281	W-phase arc pattern on cable, 37 cm.	1/13/11
282	W-phase arc pattern on cable, 37 cm.	1/13/11
283	W-phase arc pattern on cable, 37 cm.	1/13/11
284	W-phase arc pattern on cable, 37 cm.	1/13/11
285	W-phase arc pattern on cable, 37 cm.	1/13/11
286	W-phase arc pattern on cable, 37 cm.	1/13/11
287	W-phase arc pattern on cable, 37 cm.	1/13/11
288	V-phase termination components.	1/13/11
289	V-phase termination components.	1/13/11
290	V-phase termination components.	1/13/11
291	V-phase termination components.	1/13/11
292	V-phase termination components.	1/13/11
293	V-phase termination components.	1/13/11
294	V-phase break on T-bus connection.	1/13/11
295	V-phase break on T-bus connection.	1/13/11
296	V-phase break on T-bus connection.	1/13/11
297	V-phase break on T-bus connection.	1/13/11

298	V-phase break on T-bus connection.	1/13/11
299	V-phase break on T-bus connection.	1/13/11
300	V-phase break on T-bus connection.	1/13/11
301	V-phase termination components.	1/13/11
302	V-phase termination components.	1/13/11
303	V-phase termination components.	1/13/11
304	V-phase termination components.	1/13/11
305	V-phase termination components.	1/13/11
306	V-phase termination components.	1/13/11
307	V-phase termination components.	1/13/11
308	V-phase cable.	1/13/11
309	V-phase cable.	1/13/11
310	V-phase cable.	1/13/11
311	V-phase cable.	1/13/11
312	V-phase cable.	1/13/11
313	V-phase cable.	1/13/11
314	V-phase cable box.	1/13/11
315	V-phase cable box.	1/13/11
316	V-phase cable box.	1/13/11
317	V-phase cable box.	1/13/11
318	V-phase cable box.	1/13/11
319	V-phase cable box.	1/13/11
320	V-phase cable box.	1/13/11
321	V-phase cable box.	1/13/11
322	V-phase cable box.	1/13/11
323	V-phase cable box.	1/13/11
324	V-phase cable box.	1/13/11
325	V-phase primary bushing.	1/13/11
326	V-phase primary bushing.	1/13/11
327	V-phase primary bushing.	1/13/11
328	V-phase primary bushing.	1/13/11
329	U-phase termination components.	1/13/11
330	U-phase termination components.	1/13/11
331	U-phase termination components.	1/13/11
332	U-phase termination components.	1/13/11
333	U-phase termination components.	1/13/11
334	U-phase termination components.	1/13/11
335	U-phase termination components.	1/13/11
336	U-phase termination components.	1/13/11
337	U-phase termination components.	1/13/11
338	U-phase termination components.	1/13/11
339	U-phase termination components.	1/13/11
340	U-phase termination components.	1/13/11

341	U-phase termination components.	1/13/11
342	U-phase cable.	1/13/11
343	U-phase cable.	1/13/11
344	U-phase cable.	1/13/11
345	U-phase cable.	1/13/11
346	U-phase cable.	1/13/11
347	U-phase shield.	1/13/11
348	U-phase shield.	1/13/11
349	U-phase cable box.	1/13/11
350	U-phase termination flange.	1/13/11
351	U-phase termination flange.	1/13/11
352	U-phase cable box.	1/13/11
353	U-phase cable box.	1/13/11
354	U-phase cable box.	1/13/11
355	No flash.	1/13/11
356	U-phase cable box.	1/13/11
357	U-phase cable box.	1/13/11
358	U-phase cable box.	1/13/11
359	U-phase cable box.	1/13/11
360	U-phase cable box.	1/13/11
361	U-phase cable box.	1/13/11
362	U-phase cable box.	1/13/11
363	U-phase cable box.	1/13/11
364	U-phase cable box.	1/13/11
365	U-phase cable box.	1/13/11
366	U-phase cable box.	1/13/11
367	U-phase cable box.	1/13/11
368	U-phase cable box.	1/13/11
369	U-phase termination.	1/17/11
370	U-phase termination.	1/17/11
371	U-phase termination.	1/17/11
372	U-phase termination.	1/17/11
373	U-phase termination.	1/17/11
374	U-phase termination.	1/17/11
375	U-phase termination.	1/17/11
376	U-phase termination.	1/17/11
377	U-phase termination.	1/17/11
378	U-phase termination.	1/17/11
379	U-phase termination.	1/17/11
380	U-phase termination.	1/17/11
381	U-phase termination.	1/17/11
382	U-phase termination.	1/17/11
383	U-phase termination.	1/17/11

384	U-phase termination.	1/17/11
385	U-phase T-bus connection.	1/17/11
386	U-phase T-bus connection.	1/17/11
387	U-phase cable.	1/17/11
388	U-phase cable.	1/17/11
389	U-phase cable.	1/17/11
390	U-phase cable.	1/17/11
391	U-phase cable.	1/17/11
392	Artifact #1, U-phase termination wrapped for shipping.	1/17/11
393	Artifact #1, U-phase termination wrapped for shipping.	1/17/11
394	Artifact #1, U-phase termination wrapped for shipping.	1/17/11
395	Artifact #2, U-phase termination flange.	1/17/11
396	Artifact #2, U-phase termination flange.	1/17/11
397	Artifact #2, U-phase termination flange.	1/17/11
398	Artifact #2, U-phase termination flange.	1/17/11
399	Artifact #2, U-phase termination flange.	1/17/11
400	Artifact #2, U-phase termination flange.	1/17/11
401	Artifact #2, U-phase termination flange.	1/17/11
402	Artifact #2, U-phase termination flange.	1/17/11
403	Artifact #2, U-phase termination flange.	1/17/11
404	Artifact #2, U-phase termination flange.	1/17/11
405	Artifact #2, U-phase termination flange.	1/17/11
406	Artifact #2, U-phase termination flange.	1/17/11
407	Artifact #2, U-phase termination flange.	1/17/11
408	Artifact #2, U-phase termination flange.	1/17/11
409	Artifact #2, U-phase termination flange, bolt removed.	1/17/11
410	Artifact #2, U-phase termination flange, bolt removed.	1/17/11
411	Artifact #2, U-phase termination flange, bolt removed.	1/17/11
412	Artifact #2, U-phase termination flange wrapped for shipping.	1/17/11
413	Artifact #2, U-phase termination flange wrapped for shipping.	1/17/11
414	U-phase cable box, termination cover removed.	1/17/11
415	U-phase cable box, termination cover removed.	1/17/11
416	U-phase cable box, termination cover removed.	1/17/11
417	U-phase cable box, termination cover removed.	1/17/11
418	U-phase cable box, termination cover removed.	1/17/11
419	U-phase cable box, termination cover removed.	1/17/11
420	U-phase cable box, termination cover removed.	1/17/11
421	U-phase cable box, termination cover removed.	1/17/11
422	U-phase cable box, termination cover removed.	1/17/11
423	U-phase cable box, termination cover removed.	1/17/11
424	U-phase cable box, termination cover removed.	1/17/11
425	U-phase cable box, termination cover removed.	1/17/11
426	Artifact #6, U-phase metal debris from inside cable box.	1/17/11

427	Artifact #4, U-phase debris from inside cable box.	1/17/11
428	Artifact #6, U-phase metal debris from inside cable box.	1/17/11
429	Artifact #6, U-phase metal debris from inside cable box.	1/17/11
430	Artifact #6, U-phase metal debris from inside cable box.	1/17/11
431	Artifact #6, U-phase metal debris from inside cable box.	1/17/11
432	Artifact #6, U-phase metal debris from inside cable box.	1/17/11
433	Artifact #6, U-phase metal debris from inside cable box.	1/17/11
434	Artifact #5, U-phase primary bushing to transformer.	1/17/11
435	Artifact #5, U-phase primary bushing to transformer.	1/17/11
436	Artifact #5, U-phase primary bushing to transformer.	1/17/11
437	Artifact #5, U-phase primary bushing to transformer.	1/17/11
438	U-phase cable box.	1/17/11
439	U-phase cable box.	1/17/11
440	Artifact #5, U-phase primary bushing to transformer - cut T-bus cable.	1/17/11
441	Artifact #5, U-phase primary bushing to transformer - cut T-bus cable.	1/17/11
442	Artifact #5, U-phase primary bushing to transformer.	1/17/11
443	Artifact #5, T bus attached to bushing.	1/17/11
444	Artifact #5, T bus attached to bushing.	1/17/11
445	Artifact #5, T bus attached to bushing.	1/17/11
446	Artifact #5, T bus attached to bushing.	1/17/11
447	Artifact #5, U-phase primary bushing to transformer.	1/17/11
448	Artifact #5, U-phase primary bushing to transformer.	1/17/11
449	Artifact #5, U-phase primary bushing to transformer.	1/17/11
450	Artifact #5, U-phase primary bushing to transformer.	1/17/11
451	Artifact #5, U-phase primary bushing to transformer.	1/17/11
452	Artifact #5, U-phase primary bushing to transformer.	1/17/11
453	Artifact #5, U-phase primary bushing to transformer.	1/17/11
454	Artifact #5, U-phase primary bushing to transformer.	1/17/11
455	Artifact #5, U-phase primary bushing to transformer.	1/17/11
456	Artifact #5, U-phase primary bushing to transformer.	1/17/11
457	Artifact #5, U-phase primary bushing to transformer.	1/17/11
458	Artifact #5, U-phase primary bushing to transformer.	1/17/11
459	Artifact #5, U-phase primary bushing to transformer.	1/17/11
460	Artifact #5, U-phase primary bushing to transformer.	1/17/11
461	Artifact #5, U-phase primary bushing to transformer.	1/17/11
462	Artifact #5, U-phase primary bushing to transformer.	1/17/11
463	Artifact #5, U-phase primary bushing to transformer.	1/17/11
464	Artifact #5, U-phase primary bushing to transformer.	1/17/11
465	Artifact #3, U-phase shield.	1/17/11
466	Artifact #3, U-phase shield.	1/17/11
467	Artifact #3, U-phase shield.	1/17/11
468	Artifact #3, U-phase shield.	1/17/11
469	Artifact #3, U-phase shield.	1/17/11

470	Artifact #3, U-phase shield.	1/17/11
471	Artifact #3, U-phase shield.	1/17/11
472	Artifact #3, U-phase shield.	1/17/11
473	U-phase cable box.	1/17/11
474	U-phase cable box.	1/17/11
475	U-phase cable box.	1/17/11
476	U-phase cable box.	1/17/11
477	U-phase cable box.	1/17/11
478	U-phase cable box.	1/17/11
479	Artifact #4, U-phase debris from inside cable box.	1/17/11
480	Artifact #3, U-phase shield wrapped for shipping.	1/17/11
481	Artifact #3, U-phase shield wrapped for shipping.	1/17/11
482	Artifact #4, U-phase debris from inside cable box wrapped for shipping.	1/17/11
483	Artifact #4, U-phase debris from inside cable box wrapped for shipping.	1/17/11
484	Artifact #5, U-phase primary bushing to transformer wrapped for shipping.	1/17/11
485	Artifact #5, U-phase primary bushing to transformer wrapped for shipping.	1/17/11
486	Artifact #6, U-phase metal debris from inside cable box wrapped for shipg.	1/17/11
487	Artifact #6, U-phase metal debris from inside cable box wrapped for shipg.	1/17/11
488	V-phase termination components.	1/17/11
489	V-phase termination components.	1/17/11
490	V-phase termination components.	1/17/11
491	V-phase termination components.	1/17/11
492	V-phase termination components.	1/17/11
493	V-phase termination components.	1/17/11
494	V-phase termination components.	1/17/11
495	V-phase termination components.	1/17/11
496	V-phase termination components.	1/17/11
497	V-phase termination components.	1/17/11
498	V-phase termination components.	1/17/11
499	V-phase termination components.	1/17/11
500	V-phase termination components.	1/17/11
501	V-phase termination components.	1/17/11
502	V-phase termination components.	1/17/11
503	V-phase termination components.	1/17/11
504	V-phase termination components.	1/17/11
505	V-phase termination components.	1/17/11
506	Artifact #7, V-phase termination lead and T-bus.	1/17/11
507	Artifact #7, V-phase termination lead and T-bus.	1/17/11
508	Artifact #8, V-phase termination and cable.	1/17/11
509	Artifact #8, V-phase termination and cable.	1/17/11
510	Artifact #8, V-phase termination and cable.	1/17/11
511	V-phase cable box, termination cover removed.	1/17/11
512	V-phase cable box, termination cover removed.	1/17/11

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513	V-phase cable box, termination cover removed.	1/17/11
514	V-phase cable box, termination cover removed.	1/17/11
515	Artifact #11, V-phase primary bushing to transformer.	1/17/11
516	Artifact #11, V-phase primary bushing to transformer.	1/17/11
517	Artifact #11, V-phase primary bushing to transformer.	1/17/11
518	Artifact #11, V-phase primary bushing to transformer, cut T-bus cable.	1/17/11
519	Artifact #11, V-phase primary bushing to transformer, cut T-bus cable.	1/17/11
520	Artifact #11, V-phase primary bushing to transformer.	1/17/11
521	Artifact #10, V-phase metal pieces from cable box.	1/17/11
522	Artifact #10, V-phase metal pieces from cable box.	1/17/11
523	Artifact #10, V-phase metal pieces from cable box.	1/17/11
524	Artifact #11, V-phase primary bushing to transformer.	1/17/11
525	Artifact #11, V-phase primary bushing to transformer.	1/17/11
526	Artifact #11, V-phase primary bushing to transformer.	1/17/11
527	Artifact #11, V-phase primary bushing to transformer.	1/17/11
528	Artifact #11, V-phase primary bushing to transformer.	1/17/11
529	Artifact #11, V-phase primary bushing to transformer.	1/17/11
530	Artifact #11, V-phase primary bushing to transformer.	1/17/11
531	Artifact #11, V-phase primary bushing to transformer.	1/17/11
532	Artifact #11, V-phase primary bushing to transformer.	1/17/11
533	Artifact #11, V-phase primary bushing to transformer.	1/17/11
534	Artifact #11, V-phase primary bushing to transformer.	1/17/11
535	Artifact #11, V-phase primary bushing to transformer.	1/17/11
536	Artifact #11, V-phase primary bushing to transformer.	1/17/11
537	Artifact #11, V-phase primary bushing to transformer.	1/17/11
538	Artifact #11, V-phase T bus connection to bushing.	1/17/11
539	Artifact #11, V-phase T bus connection to bushing.	1/17/11
540	Artifact #11, V-phase T bus connection to bushing.	1/17/11
541	Artifact #11, V-phase T bus connection to bushing.	1/17/11
542	Artifact #11, V-phase primary bushing to transformer.	1/17/11
543	V-phase cable box.	1/17/11
544	V-phase cable box.	1/17/11
545	V-phase cable box.	1/17/11
546	V-phase cable box.	1/17/11
547	V-phase cable box.	1/17/11
548	V-phase cable box.	1/17/11
549	V-phase cable box.	1/17/11
550	Artifact #9, V-phase debris from cable box wrapped for shipping.	1/17/11
551	Artifact #9, V-phase debris from cable box wrapped for shipping.	1/17/11
552	Artifact #10, V-phase metal pieces from cable box wrapped for shipping.	1/17/11
553	Artifact #10, V-phase metal pieces from cable box wrapped for shipping.	1/17/11
554	Artifact #11, V-phase primary bushing to transformer wrapped for shipping.	1/17/11
555	Artifact #11, V-phase primary bushing to transformer wrapped for shipping.	1/17/11

556	W-phase termination.	1/17/11
557	W-phase termination.	1/17/11
558	W-phase termination.	1/17/11
559	W-phase termination.	1/17/11
560	W-phase termination.	1/17/11
561	W-phase termination.	1/17/11
562	W-phase termination.	1/17/11
563	W-phase termination.	1/17/11
564	W-phase cable, arc pattern at 37 cm.	1/17/11
565	W-phase cable, arc pattern at 37 cm.	1/17/11
566	W-phase cable, arc pattern at 37 cm.	1/17/11
567	W-phase cable, arc pattern at 37 cm.	1/17/11
568	W-phase cable, arc pattern at 37 cm.	1/17/11
569	W-phase cable.	1/17/11
570	W-phase cable.	1/17/11
571	W-phase cable.	1/17/11
572	Aluminum piece on W-phase termination.	1/17/11
573	Aluminum piece on W-phase termination.	1/17/11
574	Aluminum piece from W-phase termination.	1/17/11
575	W-phase cable.	1/17/11
576	W-phase cable.	1/17/11
577	W-phase cable.	1/17/11
578	W-phase cable.	1/17/11
579	W-phase cable.	1/17/11
580	W-phase cable.	1/17/11
581	W-phase cable.	1/17/11
582	Artifact #12, W-phase termination wrapped for shipping.	1/17/11
583	Artifact #12, W-phase termination wrapped for shipping.	1/17/11
584	Artifact #12, W-phase termination wrapped for shipping.	1/17/11
585	W-phase cable box, termination cover removed.	1/17/11
586	W-phase cable box, termination cover removed.	1/17/11
587	W-phase cable box, termination cover removed.	1/17/11
588	W-phase cable box, termination cover removed.	1/17/11
589	W-phase cable box, termination cover removed.	1/17/11
590	W-phase cable box, termination cover removed.	1/17/11
591	W-phase cable box, termination cover removed.	1/17/11
592	W-phase cable box, termination cover removed.	1/17/11
593	W-phase cable box, termination cover removed.	1/17/11
594	W-phase cable box, termination cover removed.	1/17/11
595	W-phase cable box, termination cover removed.	1/17/11
596	W-phase cable box, termination cover removed.	1/17/11
597	W-phase cable box, termination cover removed.	1/17/11
598	W-phase cable box, termination cover removed.	1/17/11

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599	W-phase cable box, termination cover removed.	1/17/11
600	W-phase cable box, termination cover removed.	1/17/11
601	W-phase cable box, termination cover removed.	1/17/11
602	W-phase cable box, termination cover removed.	1/17/11
603	W-phase cable box, termination cover removed.	1/17/11
604	W-phase cable box, termination cover removed.	1/17/11
605	W-phase cable box, termination cover removed.	1/17/11
606	W-phase T bus removed.	1/17/11
607	Artifact #14, W-phase T-bus from cable box.	1/17/11
608	Artifact #14, W-phase T-bus from cable box.	1/17/11
609	Artifact #14, W-phase T-bus from cable box.	1/17/11
610	Artifact #14, W-phase T-bus from cable box.	1/17/11
611	Artifact #14, W-phase T-bus from cable box.	1/17/11
612	Artifact #14, W-phase T-bus from cable box.	1/17/11
613	Artifact #14, W-phase T-bus from cable box.	1/17/11
614	Artifact #14, W-phase T-bus from cable box.	1/17/11
615	Artifact #14, W-phase T-bus from cable box.	1/17/11
616	Artifact #14, W-phase T-bus from cable box.	1/17/11
617	Artifact #14, W-phase T-bus from cable box.	1/17/11
618	Artifact #14, W-phase T-bus from cable box.	1/17/11
619	Artifact #14, W-phase T-bus from cable box.	1/17/11
620	Artifact #14, W-phase T-bus from cable box.	1/17/11
621	Artifact #14, W-phase T-bus from cable box.	1/17/11
622	Artifact #14, W-phase T-bus from cable box.	1/17/11
623	Artifact #14, W-phase T-bus from cable box.	1/17/11
624	Artifact #14, W-phase T-bus from cable box.	1/17/11
625	Artifact #14, W-phase T-bus from cable box.	1/17/11
626	Artifact #13, W-phase debris from cable box.	1/17/11
627	Artifact #13, W-phase debris from cable box.	1/17/11
628	Artifact #15, W-phase pressure relief.	1/17/11
629	Artifact #15, W-phase pressure relief.	1/17/11
630	Artifact #15, W-phase pressure relief.	1/17/11
631	Artifact #15, W-phase pressure relief.	1/17/11
632	Artifact #15, W-phase pressure relief.	1/17/11
633	Artifact #15, W-phase pressure relief.	1/17/11
634	Artifact #15, W-phase pressure relief.	1/17/11
635	Artifact #15, W-phase pressure relief.	1/17/11
636	Artifact #15, W-phase pressure relief.	1/17/11
637	W-phase cable box.	1/17/11
638	W-phase cable box.	1/17/11
639	W-phase cable box.	1/17/11
640	W-phase cable box.	1/17/11
641	Artifact #13, W-phase debris from cable box wrapped for shipping.	1/17/11

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642	Artifact #13, W-phase debris from cable box wrapped for shipping.	1/17/11
643	Artifact #14, W-phase T-bus from cable box wrapped for shipping.	1/17/11
644	Artifact #14, W-phase T-bus from cable box wrapped for shipping.	1/17/11
645	Artifact #15, W-phase pressure relief wrapped for shipping.	1/17/11
646	Artifact #15, W-phase pressure relief wrapped for shipping.	1/17/11
647	Artifact #15, W-phase pressure relief wrapped for shipping.	1/17/11
648	Basement under RF12.	1/18/11
649	V-phase cable in basement.	1/18/11
650	Basement under RF12.	1/18/11
651	V-phase cable in basement.	1/18/11
652	Basement under RF12.	1/18/11
653	U-phase cable in basement.	1/18/11
654	V-phase cable in basement.	1/18/11
655	U-phase cable in basement.	1/18/11
656	V-phase cable in basement.	1/18/11
657	Basement under RF12.	1/18/11
658	Basement under RF12.	1/18/11
659	W-phase cable in basement.	1/18/11
660	Basement under RF12.	1/18/11
661	W-phase cable in basement.	1/18/11
662	W-phase cable in basement.	1/18/11
663	Ground connection near W-phase cable in basement.	1/18/11
664	W-phase cable in basement.	1/18/11
665	V-phase cable and components in basement.	1/18/11
666	V-phase cable and components in basement.	1/18/11
667	V-phase cable and components in basement.	1/18/11
668	W-phase cable in basement.	1/18/11
669	W-phase cable in basement.	1/18/11
670	W-phase cable in basement.	1/18/11
671	W-phase cable in basement.	1/18/11
672	Grid locations in basement.	1/18/11
673	Grid locations in basement.	1/18/11
674	Grid locations in basement.	1/18/11
675	Grid locations in basement.	1/18/11
676	Grid locations in basement.	1/18/11
677	Grid locations in basement.	1/18/11
678	Grid locations in basement.	1/18/11
679	Grid locations in basement.	1/18/11
680	Grid locations in basement.	1/18/11
681	Photographs taken at end of day in basement.	1/18/11
682	Photographs taken at end of day in basement.	1/18/11
683	Photographs taken at end of day in basement.	1/18/11
684	Photographs taken at end of day in basement.	1/18/11

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685	Photographs taken at end of day in basement.	1/18/11
686	Photographs taken at end of day in basement.	1/18/11
687	Artifacts retained from basement.	1/18/11
688	Artifacts retained from basement.	1/18/11
689	W-phase cable box, preparing to remove primary bushing.	1/19/11
690	W-phase cable box, preparing to remove primary bushing.	1/19/11
691	W-phase cable box, preparing to remove primary bushing.	1/19/11
692	W-phase cable box, preparing to remove primary bushing.	1/19/11
693	W-phase cable box, preparing to remove primary bushing.	1/19/11
694	Artifact #32, W-phase debris from cable box between primary bushing and transformer.	1/19/11
695	Artifact #32, W-phase debris from cable box between primary bushing and transformer.	1/19/11
696	Artifact #32, W-phase debris from cable box between primary bushing and transformer.	1/19/11
697	Artifact #32, W-phase debris from cable box between primary bushing and transformer.	1/19/11
698	Artifact #43, W-phase primary bushing to transformer.	1/19/11
699	Artifact #43, W-phase primary bushing to transformer.	1/19/11
700	Artifact #43, W-phase primary bushing to transformer.	1/19/11
701	Artifact #43, W-phase primary bushing to transformer.	1/19/11
702	Artifact #43, W-phase primary bushing to transformer.	1/19/11
703	Artifact #43, W-phase primary bushing to transformer.	1/19/11
704	Artifact #43, W-phase primary bushing to transformer.	1/19/11
705	Artifact #43, W-phase primary bushing to transformer.	1/19/11
706	Artifact #43, W-phase primary bushing to transformer.	1/19/11
707	Artifact #43, W-phase primary bushing to transformer.	1/19/11
708	Artifact #43, W-phase primary bushing to transformer.	1/19/11
709	North side of regulating transformer.	1/19/11
710	North side of regulating transformer.	1/19/11
711	North side of regulating transformer.	1/19/11
712	North side of regulating transformer.	1/19/11
713	Basement under RF12.	1/19/11
714	Basement under RF12.	1/19/11
715	Basement under RF12.	1/19/11
716	Basement under RF12.	1/19/11
717	Basement under RF12.	1/19/11
718	Insulator piece found on ground near W-phase.	1/19/11
719	Insulator piece found on ground near W-phase.	1/19/11
720	Insulator piece found on ground near W-phase.	1/19/11
721	Insulator piece found on ground near W-phase.	1/19/11
722	Ground near U-phase.	1/19/11
723	Artifact #42, components found at ground level near U-phase.	1/19/11
724	Artifact #42, components found at ground level near U-phase.	1/19/11
725	Artifact #42, components found at ground level near U-phase.	1/19/11
726	Ground level near W-phase.	1/19/11
727	Artifact #41, components found at ground level near W-phase.	1/19/11

728	Artifact #41, components found at ground level near W-phase.	1/19/11
729	Artifact #40, W-phase termination components (insulator).	1/19/11
730	Artifact #40, W-phase termination components (insulator).	1/19/11
731	Artifact #40, W-phase termination components (insulator).	1/19/11
732	Ground area around cable boxes.	1/19/11
733	Ground area around cable boxes.	1/19/11
734	Ground area around cable boxes.	1/19/11
735	Ground area around cable boxes.	1/19/11
736	Ground area around cable boxes.	1/19/11
737	Ground area around cable boxes.	1/19/11
738	Artifacts wrapped for shipping.	1/20/11
739	Artifacts wrapped for shipping.	1/20/11
740	Artifacts wrapped for shipping.	1/20/11
741	Artifacts wrapped for shipping.	1/20/11
742	Artifacts wrapped for shipping.	1/20/11
743	Artifacts wrapped for shipping.	1/20/11
744	Artifacts wrapped for shipping.	1/20/11
745	Artifacts wrapped for shipping.	1/20/11
746	Artifacts wrapped for shipping.	1/20/11
747	Artifacts wrapped for shipping.	1/20/11
748	Artifacts wrapped for shipping.	1/20/11
749	Artifacts wrapped for shipping.	1/20/11
750	Artifacts wrapped for shipping.	1/20/11
751	Artifacts wrapped for shipping.	1/20/11
752	Artifacts wrapped for shipping.	1/20/11
753	Artifacts wrapped for shipping.	1/20/11
754	Artifacts wrapped for shipping.	1/20/11
755	Artifacts wrapped for shipping.	1/20/11
756	Artifacts wrapped for shipping.	1/20/11
757	Artifacts wrapped for shipping.	1/20/11
758	Artifacts wrapped for shipping.	1/20/11
759	Artifacts wrapped for shipping.	1/20/11
760	Artifacts wrapped for shipping.	1/20/11
761	Artifacts wrapped for shipping.	1/20/11
762	Artifacts wrapped for shipping.	1/20/11
763	Artifacts wrapped for shipping.	1/20/11
764	Artifacts wrapped for shipping.	1/20/11
765	Artifacts wrapped for shipping.	1/20/11
766	Artifacts wrapped for shipping.	1/20/11
767	Artifacts wrapped for shipping.	1/20/11
768	Artifacts wrapped for shipping.	1/20/11
769	Artifacts wrapped for shipping.	1/20/11
770	Artifacts wrapped for shipping.	1/20/11

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771	Artifacts wrapped for shipping.	1/20/11
772	Artifacts wrapped for shipping.	1/20/11
773	Artifacts wrapped for shipping.	1/20/11
774	Diverter switches disassembled.	1/20/11
775	Diverter switches disassembled.	1/20/11
776	Diverter switches disassembled.	1/20/11
777	Diverter switches disassembled.	1/20/11
778	Diverter switches disassembled.	1/20/11
779	Diverter switches disassembled.	1/20/11
780	Diverter switches disassembled.	1/20/11
781	Diverter switches disassembled.	1/20/11
782	Diverter switches disassembled.	1/20/11
783	Diverter switches disassembled.	1/20/11
784	Diverter switches disassembled.	1/20/11
785	Diverter switches disassembled.	1/20/11
786	Diverter switches disassembled.	1/20/11
787	Diverter switches disassembled.	1/20/11
788	Diverter switches disassembled.	1/20/11
789	Diverter switches disassembled.	1/20/11
790	Diverter switches disassembled.	1/20/11
791	Diverter switches disassembled.	1/20/11
792	Diverter switches disassembled.	1/20/11
793	Diverter switches disassembled.	1/20/11
794	Diverter switches disassembled.	1/20/11
795	Diverter switches disassembled.	1/20/11
796	RF15 220 kV terminations.	1/20/11
797	RF15 220 kV terminations.	1/20/11
798	RF15 220 kV terminations.	1/20/11
799	RF15 220 kV terminations.	1/20/11
800	RF15 220 kV terminations.	1/20/11
801	RF15 220 kV terminations.	1/20/11
802	RF15 220 kV terminations.	1/20/11
803	RF15 220 kV terminations.	1/20/11
804	Artifacts shipped to Reykjavik.	2/7/11
805	Artifacts shipped to Reykjavik.	2/7/11
806	Artifacts shipped to Reykjavik.	2/7/11
807	Artifacts #1, #12, and #8.	2/7/11
808	Artifact #1, U-phase termination.	2/7/11
809	Artifact #1, U-phase termination.	2/7/11
810	Artifact #13, W-phase debris from cable box.	2/7/11
811	Artifact #13, W-phase debris from cable box.	2/7/11
812	Artifact #13, W-phase debris from cable box.	2/7/11
813	Artifact #13, W-phase debris from cable box.	2/7/11

814	Artifact #13, W-phase debris from cable box.	2/7/11
815	Artifact #13, W-phase debris from cable box.	2/7/11
816	Artifact #13, W-phase debris from cable box.	2/7/11
817	Artifact #13, W-phase debris from cable box.	2/7/11
818	Artifact #32, W-phase debris from cable box between primary bushing and transformer.	2/7/11
819	Artifact #32, W-phase debris from cable box between primary bushing and transformer.	2/7/11
820	Artifact #32, W-phase debris from cable box between primary bushing and transformer.	2/7/11
821	Artifact #32, W-phase debris from cable box between primary bushing and transformer.	2/7/11
822	Artifact #32, W-phase debris from cable box between primary bushing and transformer.	2/7/11
823	Artifact #32, W-phase debris from cable box between primary bushing and transformer.	2/7/11
824	Artifact #32, W-phase debris from cable box between primary bushing and transformer.	2/7/11
825	Artifact #32, W-phase debris from cable box between primary bushing and transformer.	2/7/11
826	Artifact #4, U-phase debris from inside cable box.	2/7/11
827	Artifact #4, U-phase debris from inside cable box.	2/7/11
828	Artifact #4, U-phase debris from inside cable box.	2/7/11
829	Artifact #4, U-phase debris from inside cable box.	2/7/11
830	Artifact #4, U-phase debris from inside cable box.	2/7/11
831	Artifact #4, U-phase debris from inside cable box.	2/7/11
832	Artifact #9, V-phase debris from cable box.	2/7/11
833	Artifact #9, V-phase debris from cable box.	2/7/11
834	Artifact #9, V-phase debris from cable box.	2/7/11
835	Artifact #9, V-phase debris from cable box.	2/7/11
836	Artifact #9, V-phase debris from cable box.	2/7/11
837	Artifact #9, V-phase debris from cable box.	2/7/11
838	Artifact #9, V-phase debris from cable box.	2/7/11
839	Artifact #9, V-phase debris from cable box.	2/7/11
840	Artifact #9, V-phase debris from cable box.	2/7/11
841	Artifact #9, V-phase debris from cable box.	2/7/11
842	Artifact #9, V-phase debris from cable box.	2/7/11
843	Artifact #9, V-phase debris from cable box.	2/7/11
844	Artifact #34, components and debris from grid 7A.	2/7/11
845	Artifact #2, U-phase termination flange, with epoxy from Artifact #34.	2/7/11
846	Artifact #2, U-phase termination flange, with epoxy from Artifact #34.	2/7/11
847	Artifact #2, U-phase termination flange, with epoxy from Artifact #34.	2/7/11
848	Artifact #2, U-phase termination flange, with epoxy from Artifact #34.	2/7/11
849	Artifact #2, U-phase termination flange, with epoxy from Artifact #34.	2/7/11
850	Artifact #34, components and debris from grid 7A.	2/7/11
851	Artifact #34, components and debris from grid 7A.	2/7/11
852	Artifact #34, components and debris from grid 7A.	2/7/11
853	Artifact #34, components and debris from grid 7A.	2/7/11
854	Artifact #34, components and debris from grid 7A.	2/7/11
855	Artifact #34, components and debris from grid 7A.	2/7/11
856	Artifact #34, components and debris from grid 7A.	2/7/11

857	Artifact #34, components and debris from grid 7A.	2/7/11
858	Artifact #34, components and debris from grid 7A.	2/7/11
859	Artifact #34, components and debris from grid 7A.	2/7/11
860	Artifact #34, components and debris from grid 7A.	2/7/11
861	Artifact #34, components and debris from grid 7A.	2/7/11
862	Artifact #34, components and debris from grid 7A.	2/7/11
863	Artifact #34, components and debris from grid 7A.	2/7/11
864	Artifact #34, components and debris from grid 7A.	2/7/11
865	Artifact #34, components and debris from grid 7A.	2/7/11
866	Artifact #34, components and debris from grid 7A.	2/7/11
867	Artifact #34, components and debris from grid 7A.	2/7/11
868	Artifact #34, components and debris from grid 7A.	2/7/11
869	Artifact #34, components and debris from grid 7A.	2/7/11
870	Artifact #34, components and debris from grid 7A.	2/7/11
871	Artifact #34, components and debris from grid 7A.	2/7/11
872	Artifact #34, components and debris from grid 7A.	2/7/11
873	Artifact #34, components and debris from grid 7A.	2/7/11
874	Artifact #5, U-phase primary bushing to transformer.	2/7/11
875	Artifact #5, U-phase primary bushing to transformer.	2/7/11
876	Artifact #5, U-phase primary bushing to transformer.	2/7/11
877	Artifact #5, U-phase primary bushing to transformer.	2/7/11
878	Artifact #5, U-phase primary bushing to transformer.	2/7/11
879	Artifact #5, U-phase primary bushing to transformer.	2/7/11
880	Artifact #5, U-phase primary bushing to transformer.	2/7/11
881	Artifact #5, U-phase primary bushing to transformer.	2/7/11
882	Artifact #5, U-phase primary bushing to transformer.	2/7/11
883	Artifact #5, U-phase primary bushing to transformer.	2/7/11
884	Artifact #5, U-phase primary bushing to transformer.	2/7/11
885	Artifact #5, U-phase primary bushing to transformer.	2/7/11
886	Artifact #5, U-phase primary bushing to transformer.	2/7/11
887	Artifact #5, U-phase primary bushing to transformer.	2/7/11
888	Artifact #5, U-phase primary bushing to transformer.	2/7/11
889	Artifact #5, U-phase primary bushing to transformer.	2/7/11
890	Artifact #5, U-phase primary bushing to transformer.	2/7/11
891	Artifact #5, U-phase primary bushing to transformer.	2/7/11
892	Artifact #5, U-phase primary bushing to transformer.	2/7/11
893	Artifact #5, U-phase primary bushing to transformer.	2/7/11
894	Artifact #5, U-phase primary bushing to transformer.	2/7/11
895	Artifact #11, V-phase primary bushing to transformer.	2/7/11
896	Artifact #11, V-phase primary bushing to transformer.	2/7/11
897	Artifact #11, V-phase primary bushing to transformer.	2/7/11
898	Artifact #11, V-phase primary bushing to transformer.	2/7/11
899	Artifact #11, V-phase primary bushing to transformer.	2/7/11

900	Artifact #11, V-phase primary bushing to transformer.	2/7/11
901	Artifact #11, V-phase primary bushing to transformer.	2/7/11
902	Artifact #11, V-phase primary bushing to transformer.	2/7/11
903	Artifact #11, V-phase primary bushing to transformer.	2/7/11
904	Artifact #11, V-phase primary bushing to transformer.	2/7/11
905	Artifact #11, V-phase primary bushing to transformer.	2/7/11
906	Artifact #11, V-phase primary bushing to transformer.	2/7/11
907	Artifact #11, V-phase primary bushing to transformer.	2/7/11
908	Artifact #11, V-phase primary bushing to transformer.	2/7/11
909	Artifact #11, V-phase primary bushing to transformer.	2/7/11
910	Artifact #11, V-phase primary bushing to transformer.	2/7/11
911	Artifact #11, V-phase primary bushing to transformer.	2/7/11
912	Artifact #11, V-phase primary bushing to transformer.	2/7/11
913	Artifact #39, tag - components and debris from grid 6C.	2/7/11
914	Artifact #27, components and debris from grid 5B.	2/7/11
915	Artifact #27, deflector block with semi-conductor.	2/7/11
916	Artifact #27, deflector block with semi-conductor.	2/7/11
917	Artifact #27, deflector block with semi-conductor.	2/7/11
918	Artifact #27, deflector block with semi-conductor.	2/7/11
919	Artifact #27, deflector block with semi-conductor.	2/7/11
920	Artifact #27, deflector block with semi-conductor.	2/7/11
921	Artifact #27, deflector block with semi-conductor.	2/7/11
922	Artifact #27, epoxy resin pieces.	2/7/11
923	Artifact #27, epoxy resin pieces.	2/7/11
924	Artifact #37, components and debris from grids 4C and 5C.	2/7/11
925	Artifact #37, components and debris from grids 4C and 5C.	2/7/11
926	Artifact #37, components and debris from grids 4C and 5C.	2/7/11
927	Artifact #37, components and debris from grids 4C and 5C.	2/7/11
928	Artifact #37, components and debris from grids 4C and 5C.	2/7/11
929	Artifact #20, conductors from grid 4A.	2/8/11
930	Artifact #20, conductors from grid 4A.	2/8/11
931	Artifact #20, conductors from grid 4A.	2/8/11
932	Artifact #20, conductors from grid 4A.	2/8/11
933	Artifact #20, conductors from grid 4A.	2/8/11
934	Artifact #16, conductors and debris from grid 3A.	2/8/11
935	Artifact #16, conductors and debris from grid 3A.	2/8/11
936	Artifact #16, bolts, nuts - sheared.	2/8/11
937	Artifact #16, bolts, nuts - sheared.	2/8/11
938	Artifact #16, bolts, nuts - sheared.	2/8/11
939	Artifact #16, bolts, nuts - sheared.	2/8/11
940	Artifact #16, cable supports.	2/8/11
941	Artifact #16, cable supports.	2/8/11
942	Artifact #16, cable supports.	2/8/11

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943	Artifact #16, cable supports.	2/8/11
944	Artifact #16, cable supports.	2/8/11
945	Artifact #16, insulator piece.	2/8/11
946	Artifact #16, insulator piece.	2/8/11
947	Artifact #16, insulator piece.	2/8/11
948	Artifact #16, insulator piece.	2/8/11
949	Artifact #16, insulator piece.	2/8/11
950	Artifact #29, components and debris from grid 6A.	2/8/11
951	Artifact #29, components and debris from grid 6A.	2/8/11
952	Artifact #29, components and debris from grid 6A.	2/8/11
953	Artifact #29, components and debris from grid 6A.	2/8/11
954	Artifact #29, components and debris from grid 6A.	2/8/11
955	Artifact #29, components and debris from grid 6A.	2/8/11
956	Artifact #29, components and debris from grid 6A.	2/8/11
957	Artifact #29, components and debris from grid 6A.	2/8/11
958	Artifact #29, components and debris from grid 6A.	2/8/11
959	Artifact #29, components and debris from grid 6A.	2/8/11
960	Artifact #29, components and debris from grid 6A.	2/8/11
961	Artifact #29, components and debris from grid 6A.	2/8/11
962	Artifact #29, components and debris from grid 6A.	2/8/11
963	Artifact #29, components and debris from grid 6A.	2/8/11
964	Artifact #35, components and debris from grid 8A.	2/8/11
965	Artifact #35, components and debris from grid 8A.	2/8/11
966	Artifact #35, components and debris from grid 8A.	2/8/11
967	Artifact #35, components and debris from grid 8A.	2/8/11
968	Artifact #35, components and debris from grid 8A.	2/8/11
969	Artifact #22, components and debris from grid 4B.	2/8/11
970	Artifact #22, components and debris from grid 4B.	2/8/11
971	Artifact #22, components and debris from grid 4B.	2/8/11
972	Artifact #17, components and debris from grid 3B.	2/8/11
973	Artifact #17, components and debris from grid 3B.	2/8/11
974	Artifact #17, components and debris from grid 3B.	2/8/11
975	Artifact #17, components and debris from grid 3B.	2/8/11
976	Artifact #17, components and debris from grid 3B.	2/8/11
977	Artifact #17, components and debris from grid 3B.	2/8/11
978	Artifact #17, components and debris from grid 3B.	2/8/11
979	Artifact #17, components and debris from grid 3B.	2/8/11
980	Artifact #17, components and debris from grid 3B.	2/8/11
981	Artifact #17, components and debris from grid 3B.	2/8/11
982	Artifact #17, components and debris from grid 3B.	2/8/11
983	Artifact #17, components and debris from grid 3B.	2/8/11
984	Artifact #17, components and debris from grid 3B.	2/8/11
985	Artifact #19, components and debris from grid 4A.	2/8/11

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986	Artifact #19, components and debris from grid 4A.	2/8/11
987	Artifact #19, components and debris from grid 4A.	2/8/11
988	Artifact #19, components and debris from grid 4A.	2/8/11
989	Artifact #19, components and debris from grid 4A.	2/8/11
990	Artifact #36, components from grid 7C.	2/8/11
991	Artifact #36, components from grid 7C.	2/8/11
992	Artifact #36, components from grid 7C.	2/8/11
993	Artifact #36, components from grid 7C.	2/8/11
994	Artifact #36, components from grid 7C.	2/8/11
995	Artifact #38, components and debris from grid 8B.	2/8/11
996	Artifact #38, components and debris from grid 8B.	2/8/11
997	Artifact #38, components and debris from grid 8B.	2/8/11
998	Artifact #38, components and debris from grid 8B.	2/8/11
999	Artifact #38, components and debris from grid 8B.	2/8/11
1000	Artifact #38, components and debris from grid 8B.	2/8/11
1001	Artifact #38, components and debris from grid 8B.	2/8/11
1002	Artifact #38, components and debris from grid 8B.	2/8/11
1003	Artifact #42, components found at ground level near U-phase.	2/8/11
1004	Artifact #42, components found at ground level near U-phase.	2/8/11
1005	Artifact #42, components found at ground level near U-phase.	2/8/11
1006	Artifact #42, components found at ground level near U-phase.	2/8/11
1007	Artifact #42, components found at ground level near U-phase.	2/8/11
1008	Artifact #42, components found at ground level near U-phase.	2/8/11
1009	Artifact #42, components found at ground level near U-phase.	2/8/11
1010	Artifact #42, components found at ground level near U-phase.	2/8/11
1011	Artifact #42, components found at ground level near U-phase.	2/8/11
1012	Artifact #42, components found at ground level near U-phase.	2/8/11
1013	Artifact #42, components found at ground level near U-phase.	2/8/11
1014	Artifact #42, components found at ground level near U-phase.	2/8/11
1015	Artifact #42, components found at ground level near U-phase.	2/8/11
1016	Artifact #42, components found at ground level near U-phase.	2/8/11
1017	Artifact #41, components found at ground level near W-phase.	2/8/11
1018	Artifact #41, components found at ground level near W-phase.	2/8/11
1019	Artifact #41, components found at ground level near W-phase.	2/8/11
1020	Artifact #41, components found at ground level near W-phase.	2/8/11
1021	Artifact #41, components found at ground level near W-phase.	2/8/11
1022	Artifact #41, components found at ground level near W-phase.	2/8/11
1023	Artifact #41, components found at ground level near W-phase.	2/8/11
1024	Artifact #41, components found at ground level near W-phase.	2/8/11
1025	Artifact #41, components found at ground level near W-phase.	2/8/11
1026	Artifact #41, components found at ground level near W-phase.	2/8/11
1027	Artifact #41, components found at ground level near W-phase.	2/8/11
1028	Artifact #41, components found at ground level near W-phase.	2/8/11

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1029	Artifact #41, components found at ground level near W-phase.	2/8/11
1030	Artifact #41, components found at ground level near W-phase.	2/8/11
1031	Artifact #41, components found at ground level near W-phase.	2/8/11
1032	Artifact #41, components found at ground level near W-phase.	2/8/11
1033	Artifact #41, components found at ground level near W-phase.	2/8/11
1034	Artifact #41, components found at ground level near W-phase.	2/8/11
1035	Artifact #41, components found at ground level near W-phase.	2/8/11
1036	Artifact #41, components found at ground level near W-phase.	2/8/11
1037	Artifact #41, components found at ground level near W-phase.	2/8/11
1038	Artifact #41, components found at ground level near W-phase.	2/8/11
1039	Artifact #41, components found at ground level near W-phase.	2/8/11
1040	Artifact #41, components found at ground level near W-phase.	2/8/11
1041	Artifact #40, W-phase termination components (insulator).	2/8/11
1042	Artifact #40, W-phase termination components (insulator).	2/8/11
1043	Artifact #40, W-phase termination components (insulator).	2/8/11
1044	Artifact #40, W-phase termination components (insulator).	2/8/11
1045	Artifact #40, W-phase termination components (insulator).	2/8/11
1046	Artifact #33, components and debris from grid 7B.	2/8/11
1047	Artifact #33, components and debris from grid 7B.	2/8/11
1048	Artifact #33, components and debris from grid 7B.	2/8/11
1049	Artifact #33, components and debris from grid 7B.	2/8/11
1050	Artifact #33, ground connection.	2/8/11
1051	Artifact #33, components and debris from grid 7B.	2/8/11
1052	Artifact #33, components and debris from grid 7B.	2/8/11
1053	Artifact #33, components and debris from grid 7B.	2/8/11
1054	Artifact #33, components and debris from grid 7B.	2/8/11
1055	Artifact #33, components and debris from grid 7B.	2/8/11
1056	Artifact #33, components and debris from grid 7B.	2/8/11
1057	Artifact #33, components and debris from grid 7B.	2/8/11
1058	Artifact #33, components and debris from grid 7B.	2/8/11
1059	Artifact #33, components and debris from grid 7B.	2/8/11
1060	Artifact #33, components and debris from grid 7B.	2/8/11
1061	Artifact #33, components and debris from grid 7B.	2/8/11
1062	Artifact #33, components and debris from grid 7B.	2/8/11
1063	Artifact #33, components and debris from grid 7B.	2/8/11
1064	Artifact #33, components and debris from grid 7B.	2/8/11
1065	Artifact #33, components and debris from grid 7B.	2/8/11
1066	Artifact #33, components and debris from grid 7B.	2/8/11
1067	Artifact #33, components and debris from grid 7B.	2/8/11
1068	Artifact #33, ground connection.	2/8/11
1069	Artifact #33, ground connection.	2/8/11
1070	Artifact #33, components and debris from grid 7B.	2/8/11
1071	Artifact #33, components and debris from grid 7B.	2/8/11

1072	Artifact #33, components and debris from grid 7B.	2/8/11
1073	Artifact #25, concrete and components from grid 5A.	2/8/11
1074	Artifact #25, concrete and components from grid 5A.	2/8/11
1075	Artifact #25, concrete and components from grid 5A.	2/8/11
1076	Artifact #25, concrete and components from grid 5A.	2/8/11
1077	Artifact #25, concrete and components from grid 5A.	2/8/11
1078	Artifact #25, concrete and components from grid 5A.	2/8/11
1079	Artifact #25, concrete and components from grid 5A.	2/8/11
1080	Artifact #25, concrete and components from grid 5A.	2/8/11
1081	Artifact #25, concrete and components from grid 5A.	2/8/11
1082	Artifact #25, concrete and components from grid 5A.	2/8/11
1083	Artifact #25, concrete and components from grid 5A.	2/8/11
1084	Artifact #25, concrete and components from grid 5A.	2/8/11
1085	Artifact #18, components and debris from grid 4A.	2/8/11
1086	Artifact #18, components and debris from grid 4A.	2/8/11
1087	Artifact #18, components and debris from grid 4A.	2/8/11
1088	Artifact #18, components and debris from grid 4A.	2/8/11
1089	Artifact #18, components and debris from grid 4A.	2/8/11
1090	Artifact #18, components and debris from grid 4A.	2/8/11
1091	Artifact #18, components and debris from grid 4A.	2/8/11
1092	Artifact #18, components and debris from grid 4A.	2/8/11
1093	Artifact #18, components and debris from grid 4A.	2/8/11
1094	Artifact #18, components and debris from grid 4A.	2/8/11
1095	Artifact #18, components and debris from grid 4A.	2/8/11
1096	Artifact #18, components and debris from grid 4A.	2/8/11
1097	Artifact #18, components and debris from grid 4A.	2/8/11
1098	Artifact #18, components and debris from grid 4A.	2/8/11
1099	Artifact #18, components and debris from grid 4A.	2/8/11
1100	Artifact #18, components and debris from grid 4A.	2/8/11
1101	Artifact #18, components and debris from grid 4A.	2/8/11
1102	Artifact #18, components and debris from grid 4A.	2/8/11
1103	Artifact #18, components and debris from grid 4A.	2/8/11
1104	Artifact #18, components and debris from grid 4A.	2/8/11
1105	Artifact #31, components and debris from grid 6B.	2/8/11
1106	Artifact #31, components and debris from grid 6B.	2/8/11
1107	Artifact #31, components and debris from grid 6B.	2/8/11
1108	Artifact #31, components and debris from grid 6B.	2/8/11
1109	Artifact #31, components and debris from grid 6B.	2/8/11
1110	Artifact #31, components and debris from grid 6B.	2/8/11
1111	Artifact #31, components and debris from grid 6B.	2/8/11
1112	Artifact #30, components and debris from grid 6B.	2/8/11
1113	Artifact #30, components and debris from grid 6B.	2/8/11
1114	Artifact #30, components and debris from grid 6B.	2/8/11

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1115	Artifact #30, components and debris from grid 6B.	2/8/11
1116	Artifact #30, components and debris from grid 6B.	2/8/11
1117	Artifact #30, components and debris from grid 6B.	2/8/11
1118	Artifact #30, components and debris from grid 6B.	2/8/11
1119	Artifact #30, components and debris from grid 6B.	2/8/11
1120	Artifact #30, components and debris from grid 6B.	2/8/11
1121	Artifact #30, insulator pieces.	2/8/11
1122	Artifact #30, insulator pieces.	2/8/11
1123	Artifact #30, insulator pieces.	2/8/11
1124	Artifact #30, insulator pieces.	2/8/11
1125	Artifact #30, insulator pieces.	2/8/11
1126	Artifact #30, insulator pieces.	2/8/11
1127	Artifact #30, insulator pieces.	2/8/11
1128	Artifact #30, insulator pieces.	2/8/11
1129	Artifact #30, insulator pieces.	2/8/11
1130	Artifact #30, insulator pieces.	2/8/11
1131	Artifact #30, insulator pieces.	2/8/11
1132	Artifact #30, insulator pieces.	2/8/11
1133	Artifact #30, bolts.	2/8/11
1134	Artifact #30, bolts.	2/8/11
1135	Artifact #30, deflector block with semi-conductor.	2/8/11
1136	Artifact #30, deflector block with semi-conductor.	2/8/11
1137	Artifact #30, deflector block with semi-conductor.	2/8/11
1138	Artifact #30, deflector block with semi-conductor.	2/8/11
1139	Artifact #30, deflector block with semi-conductor.	2/8/11
1140	Artifact #30, deflector block with semi-conductor.	2/8/11
1141	Artifact #30, components and debris from grid 6B.	2/8/11
1142	Artifact #30, components and debris from grid 6B.	2/8/11
1143	Artifact #30, components and debris from grid 6B.	2/8/11
1144	Artifact #30, ground circuit components.	2/8/11
1145	Artifact #30, components and debris from grid 6B.	2/8/11
1146	Artifact #30, components and debris from grid 6B.	2/8/11
1147	Artifact #30, components and debris from grid 6B.	2/8/11
1148	Artifact #30, components and debris from grid 6B.	2/8/11
1149	Artifact #30, components and debris from grid 6B.	2/8/11
1150	Artifact #23, components and debris from grid 5A.	2/8/11
1151	Artifact #23, components and debris from grid 5A.	2/8/11
1152	Artifact #23, components and debris from grid 5A.	2/8/11
1153	Artifact #23, components and debris from grid 5A.	2/8/11
1154	Artifact #23, components and debris from grid 5A.	2/8/11
1155	Artifact #23, ground circuit components.	2/8/11
1156	Artifact #23, ground circuit components.	2/8/11
1157	Artifact #23, ground circuit components.	2/8/11

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1158	Artifact #23, ground circuit components.	2/8/11
1159	Artifact #23, ground circuit components.	2/8/11
1160	Artifact #23, components and debris from grid 5A.	2/8/11
1161	Artifact #23, components and debris from grid 5A.	2/8/11
1162	Artifact #23, components and debris from grid 5A.	2/8/11
1163	Artifact #23, components and debris from grid 5A.	2/8/11
1164	Artifact #23, components and debris from grid 5A.	2/8/11
1165	Artifact #23, components and debris from grid 5A.	2/8/11
1166	Artifact #23, insulator piece.	2/8/11
1167	Artifact #23, insulator piece.	2/8/11
1168	Artifact #23, components and debris from grid 5A.	2/8/11
1169	Artifact #23, components and debris from grid 5A.	2/8/11
1170	Artifact #23, oil purge from back of cable box.	2/8/11
1171	Artifact #23, oil purge from back of cable box.	2/8/11
1172	Artifact #23, oil purge from back of cable box.	2/8/11
1173	Artifact #23, oil purge from back of cable box.	2/8/11
1174	Artifact #23, oil purge from back of cable box.	2/8/11
1175	Artifact #23, oil purge from back of cable box.	2/8/11
1176	Artifact #23, components and debris from grid 5A.	2/8/11
1177	Artifact #23, components and debris from grid 5A.	2/8/11
1178	Artifact #23, components and debris from grid 5A.	2/8/11
1179	Artifact #21, components and debris from grid 4B.	2/9/11
1180	Artifact #21, components and debris from grid 4B.	2/9/11
1181	Artifact #21, components and debris from grid 4B.	2/9/11
1182	Artifact #21, components and debris from grid 4B.	2/9/11
1183	Artifact #21, components and debris from grid 4B.	2/9/11
1184	Artifact #21, components and debris from grid 4B.	2/9/11
1185	Artifact #21, components and debris from grid 4B.	2/9/11
1186	Artifact #21, components and debris from grid 4B.	2/9/11
1187	Artifact #21, components and debris from grid 4B.	2/9/11
1188	Artifact #21, components and debris from grid 4B.	2/9/11
1189	Artifact #21, components and debris from grid 4B.	2/9/11
1190	Artifact #21, components and debris from grid 4B.	2/9/11
1191	Artifact #21, components and debris from grid 4B.	2/9/11
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EXHIBIT C3

REQUEST FOR ARBITRATION



Report.

Root cause of the breakdown in the Alcoa Hjarðaal network on December 18th 2010 of a 220 kV regulating transformer RF12 of Fuji with a 220 kV XLPE cable connection of Silec

Arnhem, May 17, 2011



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**Root cause of the breakdown
in the Alcoa Fjarðaál network
on December 18th, 2010
of a 220 kV regulating transformer
RF12 of Fuji with a 220 kV XLPE cable
connection of Silec**

Arnhem, May 17, 2011

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SUMMARY

In December 2010, a breakdown occurred in a 220 kV regulation transformer RF12 manufactured and installed by Fuji Electric Corporation, with a feeding 220 kV XLPE cable connected, manufactured and installed by Silec Cable.

The root cause of the failure is a crack of the epoxy resin insulator of Silec Cable's termination inside the cable junction box that got this crack during or before the installation work in or before 2007.

It is recommended to check the terminations for PD activity, if possible.



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1 INTRODUCTION

On December 18th, 2010, a breakdown occurred in a 220 kV regulation transformer RT12 manufactured and installed by Fuji Electric Corporation, with a feeding 220 kV XLPE cable connected, manufactured and installed by Silec Cable.

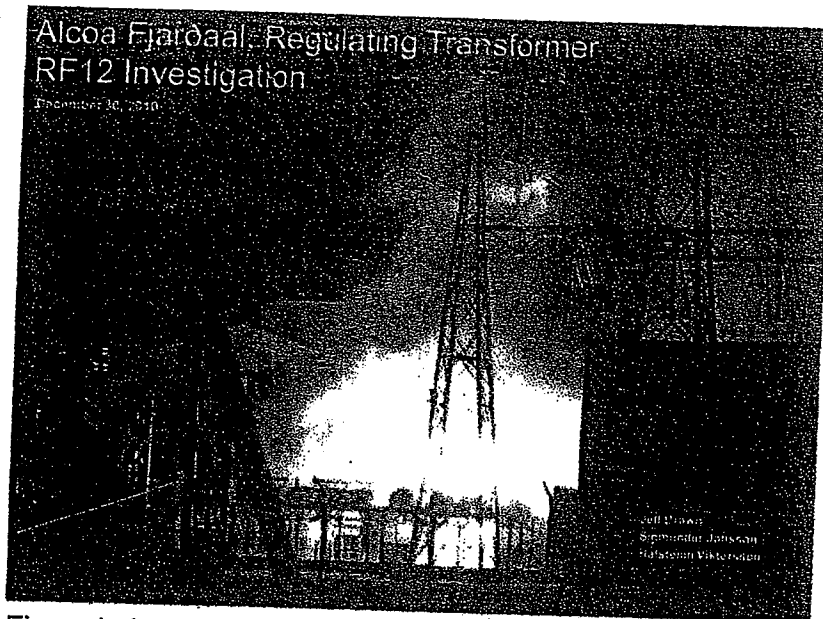


Figure 1 Image of the fire incident after the breakdown in transformer R12 from [14].

Since the breakdown caused a lot of additional damage, mainly because of a fire, the quest for the root cause is very important. The parties involved, Alcoa, Fuji Electric Corporation and Silec Cable, had a first investigation that started soon after the failure and for which they had support from Kevin Kennedy Associates from the USA. During this investigation, the remains from the failed components were collected and partly also cleaned in a professional way, such making it possible to partly trace back the possible origin of certain components and also the development of the breakdown process. Moreover, various reports were written meanwhile discussing all that was found. The reference list in this report is mentioning all these documents and reports as being made available to KEMA.

The investigations mentioned above point all towards the cable junction box of the transformer R12 as the most probable area where the breakdown happened. This cable junction box has parts manufactured and installed by Fuji Electric Corporation and a part manufactured and installed by Silec Cable, being the 220 kV cable and its termination.



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KEMA was asked and ordered by Alcoa and in agreement with the manufacturers involved to give the findings a further investigation, such to become more conclusive on the cause of breakdown.

The investigation and discussions took place on April 28th and 29th, 2011 at Alcoa's premises in Hafnarfjörður in Iceland. In a hall, all relevant cable junction box and transformer parts were laid down on the ground and tables, well arranged, and where possible as they originally had been installed.

During this investigation and related discussions, the following persons were present:

- from Alcoa (Iceland):
 - Sigmundur Jonsson, electrical engineer High-Voltage
- from Silec (France):
 - Pierre Gofflo, site test engineer
- from CET Risques ELEctrotechniques (France):
 - Yves Boulanger, director Technique Groupe CET
- from Fuji Electric (Japan):
 - Kazuhiro Muto
- from Japan AE Power Systems Corporation (Japan):
 - Keizo Kawanishi, manager transformer design department
 - Akira Matsuyama, manager transformer quality assurance inspection section
- from Kevin Kennedy Associates (USA):
 - Beth Anderson, consultant
 - Mark Lautenschlager, consultant
- from KEMA (the Netherlands):
 - Fred Steennis, principle consultant.

KEMA was also asked to lead the discussions during the investigation period.

After the investigations and discussions it was agreed that KEMA would make a summary report of the findings, being the report at hand. This report will not redo all the work that has been done already, like showing and discussing all artifacts found. In stead, this report will refer to documents where this information has already been made available. Only a few important findings will be depicted in this report (again) if needed. The main part of this report will focus on these important findings and the conclusions that can be drawn from here.

In this report, chapter 2 treats the construction of the failed component(s). After that a summary is given of some historical facts like the commissioning date, the service conditions



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and some diagnostic test results gathered over time, see section 3. The most important findings are shown in chapter 4. The following chapter 5 evaluates these findings after which the conclusions are written down in chapter 6, followed by recommendations in chapter 7. In chapter 8 the documents and other source material used are given.

2 CONSTRUCTION OF THE CABLE JUNCTION BOX AND CABLE TERMINATION

The references [2], [3], [4], [5] and [14] give details on the construction of the cable, the cable termination and the cable junction box. These parts are important because here the breakdown occurred. More information of the system can be found in the archives or Alcoa if needed and in the network schema in [1].

One can see in Figure 2 of the cable junction box that the cable termination is connected to the transformer and to an over voltage arrester via an oil filled compartment and spacers. The arrester tank is filled with SF₆, its pressure being above 1 bar. The transformer and cable junction box are filled with transformer oil at 1 bar pressure. The termination has an insulator of epoxy resin. Not shown in the drawing of Figure 2 is that the connection lead of copper is wrapped with a kind of crêpe paper to avoid bridging of impurities in the oil. The transformer and cable junction box are made and installed by Fuji Electric Corporation.

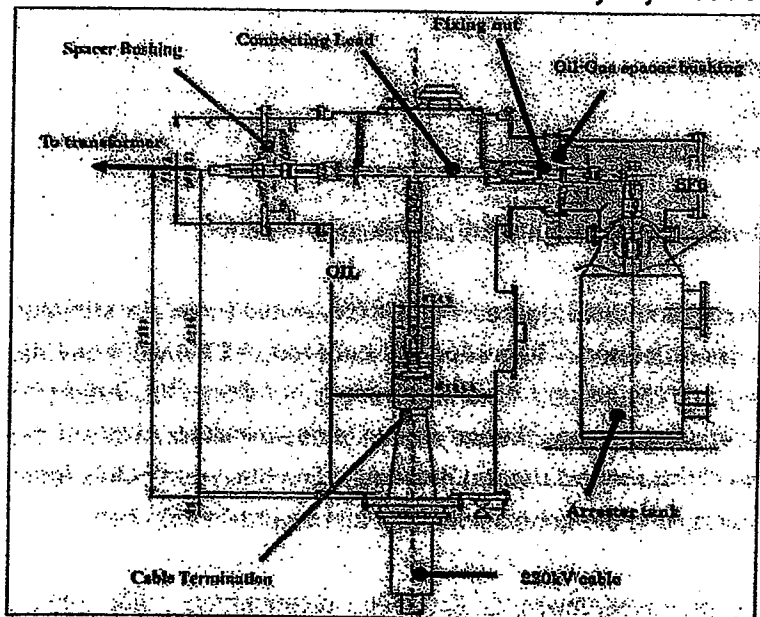


Figure 2 Internal construction of the 220 kV cable junction box from [14].

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In Figure 3 the cable termination is shown in much more detail. The termination is a Silec Cable 245 kV oil-filled termination S/N 15XP1188, delivered on June 28th, 2006. The cable is an XLPE cable of the 220 kV voltage class, manufactured and installed by Silec Cable, the cable being an 800 mm² Cu XLPE insulated cable 220 kV, S/N 15XP1188. Under the epoxy resin insulator of the cable termination (5) in Figure 3 there is an insulating oil of high viscosity. A high viscosity oil is needed to protect the XLPE and its semiconducting plastic layers from degradation (as could happen with a low viscosity 'transformer' oil). For that reason the construction is made such that there is no oil exchange between the termination and the cable junction box. From an electrical point of view the highest electrical fields can be found in and under the stress-cone (6) in Figure 3. The oil in and outside the termination is needed because of the short insulator length, giving protection against tracking between the high voltage parts in the top of the termination and the grounded parts in the bottom of the termination.

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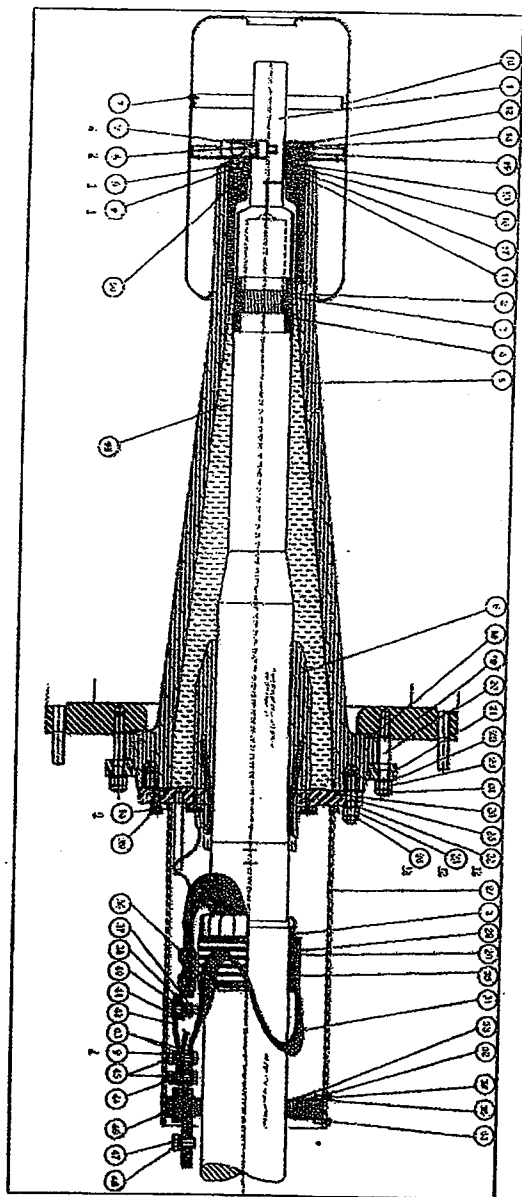


Figure 3 Cable termination construction in the 220 kV cable junction box from [4].

3 HISTORICAL ISSUES

The cable junction box is part of a voltage regulating transformer RT12. There are in total 5 of these transformers. The rating of each of these transformers is 174 MVA, operating at a

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voltage level of 220 kV. The year of manufacture is 2005 and the transformers are installed and in operation since 2007. The cable connected is made by Silec, also in operation since 2007.

KEMA did not receive information on the prequalification tests and factory acceptance test that have been done on the cable (and termination). The commissioning test was a 1 U₀ test during 24 hours, in line with the IEC IEC 62067.

Apart from the failure incident in December 2010, there have been no other failures in this or similar installations of Alcoa.

Over time, there is no indication that there have been abnormal load conditions in the network. There was also no recent lightning activity from which an over voltage could have entered the installation.

It is important to learn that the bushing between the arrester and cable junction box needed treatment after DGA measurements of the oil from the cable junction boxes of most of all the 5 installations showed a high level of acetylene gas (C₂H₂). Fuji Electric Corporation concluded that this was due to a metal part that was floating (probably due to the pressure difference and the resulting small deformation), meanwhile giving partial discharge activity on the bushing surface, being also the cause of the acetylene gas concentrations found. In December 2010, Fuji Electric Corporation conducted maintenance within the cable boxes. They tightened a nut on the arrester spacer bushing during which work the cable junction box oil was removed and a person entered this cable junction box to be able to reach the spacer (entrance is on the right hand side of the top of the termination in Figure 2). This was done on the spacers for all cable boxes of the 5 transformers. After this maintenance operation the cable junction boxes were put on vacuum to remove moisture and were refilled with oil. Following this maintenance work, from most cable junction boxes the acetylene disappeared, shown by monthly DGA testing. However, in the transformer RT12, the W-phase, a small amount of acetylene appeared and was about 10 ppm. See for detailed information also [6], [7], [8], [14], [16], summarized in [19] (the last reference shown in appendix I).

This W-phase of RT12 was also the compartment that broke down in December 2010. The power source that created the fault current was on the cable side of the fault location. The fault was cleared after 78 ms.

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4 IMPORTANT FINDINGS

In a failure incident like this one, especially if a fire might have removed possible evidence, there is one important item one can search for anyhow. That is the foot point of the arc, which helps to identify where a failure started. Such a foot point has the following characteristics:

- one foot point has to be at the high voltage conductor
- one counter foot point has to be at a grounded element
- the arc between the foot points is there only during the fault. In this time a moving arc might create other foot points as well, but always further away from the first foot points, away from the power source due to the fact that an arc wants to drift away from its power source due to its magnetic field and its related forces
- the foot points normally have a draught (or hole) because of material that has molten away
- in this case, where the fault was switched off after 78 ms, it is expected that the foot point(s) are not very big.

Inspecting all components and artifacts, there was one possible foot point of an arc found. That was about 58 cm below the top of the conductor (1) in Figure 3 as identified schematically in Figure 7 with a red dot (close to the red arrow). In Figure 4 this spot can be seen, with a further detail in Figure 5. Because of the local melting and the draughts it was concluded that this damage of the conductor was very probably NOT the result of the fire, else the melting would have been much more wide spread as can be seen for instance in other artifacts. The fact that the arc duration was only 78 ms can further explain that the damaged area is limited in size.

The counter foot point was not found, but the grounded bottom plate that is closest to the above mentioned foot point was too much fragmented and damaged by the fire to conclude on this. This point of the possible area for the counter foot point is identified with a blue arrow in Figure 7.

A further important fact found was electrical treeing on the inside of some parts of the epoxy insulator, very probably from the failed phase W. An example is shown in Figure 6. The fine electrical treeing structures need time (days, weeks, months or years) to grow and thus this is another important clue that could help to find the cause of the breakdown. These electrical trees were found stretching upward many cm's starting close to the bottom part of the insulator along and above the green line in Figure 7. Not many epoxy resin insulator parts were found, so it could not be confirmed how far these electrical trees went up.



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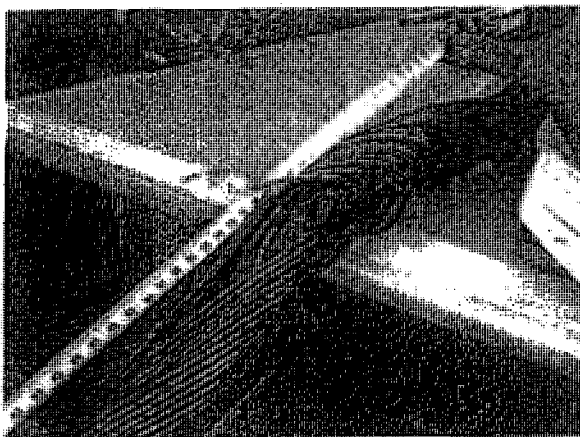


Figure 4 Possible foot point of an arc in the high voltage conductor of the cable, found about 58 cm below the top of the termination.

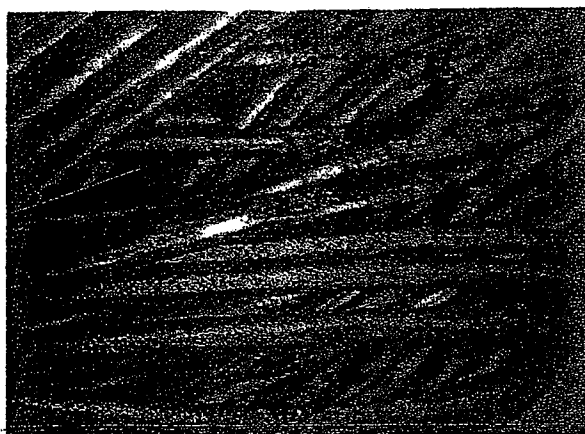


Figure 5 Detail of the possible foot point of an arc as shown in Figure 4. One can see here the local melting and a droplet of copper.

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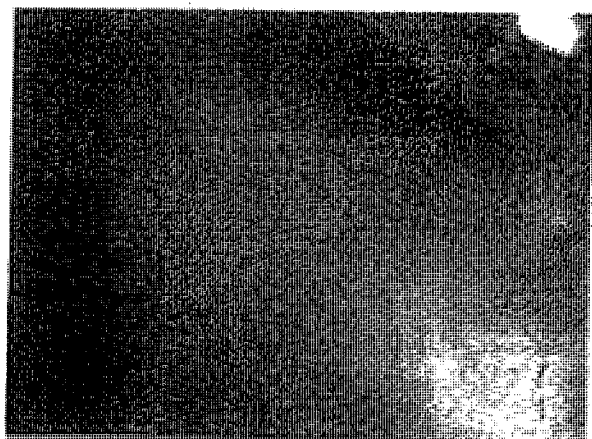


Figure 6 Electrical trees found on the inside of the epoxy insulator of (probably) phase W. These electrical trees were found stretching upward over 10-s of cm starting close to the bottom part of the insulator along and above the green line in Figure 7.

Many other interesting artifacts were studied, but all others were contributed to the consequence of the breakdown. In a more extensive report these could be discussed if needed, but this report is limited to those artifacts that help to identify the cause of breakdown.

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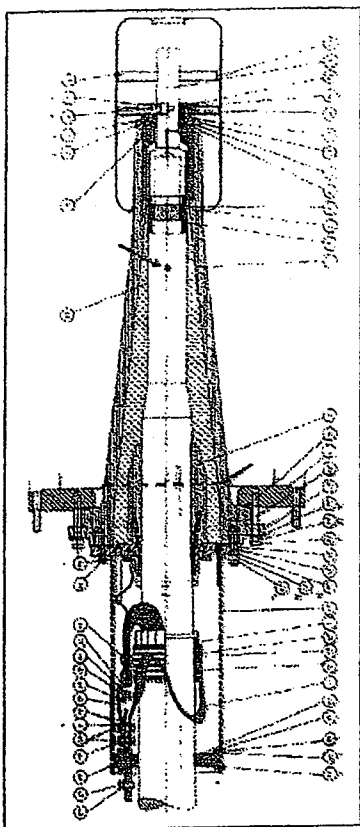


Figure 7 Cable termination with possible foot point of the arc (identified with a red dot and arrow), the possible foot point in the grounded region (blue arrow) and the possible crack area (green line and arrow).

5 EVALUATION RESULTS

Taking into account the findings in the previous section 4, the most plausible cause of breakdown is in the termination, creating an arc (red line in Figure 8) between the foot point (red dot in Figure 8) and the counter foot point (blue arrow in Figure 8).

But what is the source of this arc? The best clue is given by the electrical treeing observed. This electrical treeing is clearly visible in the bottom part on the inside of the epoxy-resin insulator and it shows that probably something was wrong with the insulation quality of the oil inside the termination. Would it be just the oil being of bad quality (for instance because of impurities coming from the upper region of the termination), then one would expect the

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electrical treeing along the stress-cone and cable insulation, not so much along the epoxy resin insulator close to the grounding plate. Would there have been a crack of the insulator, then electrical treeing is not uncommon, as has been observed in another case [18]. It is the author's opinion that a crack alone is not enough to create electrical treeing as observed. Probably the crack has been partly opened when the cable junction box was put on vacuum and due to that some termination insulation oil was sucked into the cable junction box, meanwhile lowering the oil level inside the termination, possibly to a level as indicated with the pink line and arrow in Figure 8. Some air from the cable conductor could possibly have entered the high viscosity oil as there is a small connection channel between the conductor and the area around the cable. The electrical treeing and tracking found from this point on its way along the cable insulation surface and this tracking weakened the cable insulation such that it created a breakdown at the indicated red spot in Figure 8. It is also possible that the oil level was lowered to the red spot region, but which of these two oil levels is the right one is not important; that is more a matter of taste.

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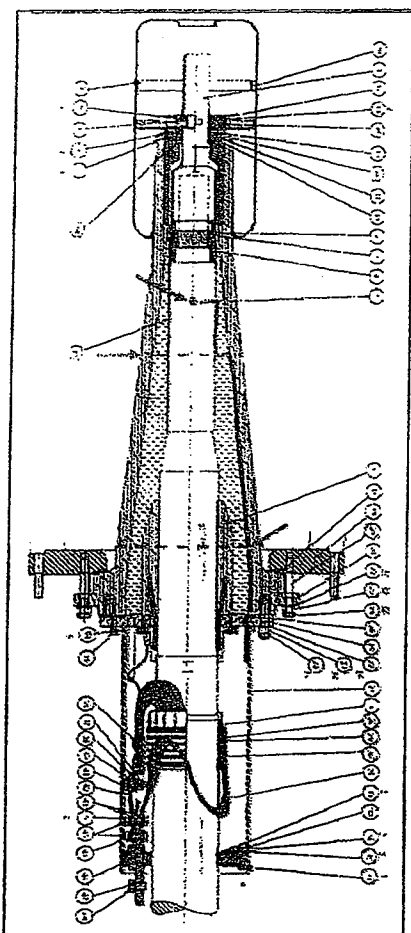


Figure 8 Cable termination with possible foot point of the arc (identified with a red dot and arrow), the oil level just before the breakdown (pink line and arrow), the possible foot point in the grounded region (blue arrow), the possible crack area (green line and arrow) and breakdown arc path (red line).

There are a few things that need a further discussion. It is the acetylene gasses found and its origin and secondly whether the other findings do fit with a breakdown as assumed here. Also of importance is now, what has caused this cracking of the epoxy resin insulator.

The acetylene gasses are a product of the electrical treeing that has probably entered the cable junction box while it was put on vacuum after the maintenance work of Fuji in the cable junction box. It is not expected that the crack was opened into a complete gap after it was put on vacuum since, in that case, one would expect a growing level of acetylene.

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The breakdown caused an explosion of the epoxy resin insulator during which the bottom plate of the termination was ripped off from the cable junction box and the arc plus the transformer oil from the cable junction box together with outside air were enough to start the fire. The huge mechanical forces ripped off all conductor connections and its damage was easily seen in the remaining artifacts found. The only point the author does not fully understand is that no fragments of the epoxy insulator were found inside the cable junction box. Maybe, this was because the huge amount of oil flowing down did carry all major fractions of the epoxy outside of the cable junction box.

The most important point is probably what caused the cracking of the epoxy insulator. There are two major moments this could have happened:

- before commissioning (for instance during transportation or installation)
- during the maintenance work of Fuji carried out in 2008 / 2009 on the bushing.

In both cases it is for instance possible that someone by accident did hit the insulator and a crack developed, although it can stay unseen. But it was learned that suddenly, after the maintenance work, the acetylene gases appeared clearly in the cable junction box of phase W [19], see also appendix I. After filling the cable junction box with oil under a higher pressure it is not expected that oil from the termination with acetylene gasses could still enter the cable junction box. It is therefore more probable that these gasses were already created in an earlier stage and that polluted high viscosity oil did enter the cable junction box when it was put on vacuum after the maintenance operation. In other words, it is most probable that the crack was already in the epoxy resin insulator on commissioning.

6 CONCLUSIONS

The root cause of the failure is a crack in the epoxy resin insulator of the cable termination that got this crack during or before the installation work in or before 2007. The degradation that caused the failure in 2010 started as follows. After this installation work in or before 2007 and as agreed as a normal commissioning action, the cable junction box was put on vacuum by Fuji Electric Corporation to remove any moisture from the cable junction box. With that, the oil level in the termination was lowered since it was partly suck via the crack into the cable junction box that was put on vacuum. The high viscosity oil that entered the cable junction box was not polluted so far since there has not been any electrical degradation. During this operation under vacuum, probably also some air from the cable conductor was

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suck into the high viscosity oil in the cable termination box as there was a small connection channel to make this possible. During the successive operation by Alcoa under service conditions, the air bubbles inside the oil and the low oil level (both inside the termination) started a process of electrical treeing inside the termination along the inner epoxy insulator surface. In this period, the electrical trees seen were created. Now, among others, acetylene gasses were made as well. But so far these gasses stayed inside the termination because of the over pressure of the transformer oil inside the cable junction box. After the maintenance operation by Fuji Electric Corporation the cable junction box was put on vacuum for the second time by Fuji Electric Corporation, which was also now a normal commissioning action, agreed and needed to remove any moisture that might have entered the cable junction box during the maintenance operation. During this action, the cable junction box got polluted with some high viscosity oil from the termination having now gasses as acetylene (so, it was not the maintenance that created the crack, but the vacuum after the maintenance that brought the already polluted high viscosity oil into the cable junction box). These gasses were now released into the oil in the cable junction box and were measured by Alcoa later indeed and as expected didn't grow in quantity, but were nevertheless an indication that something had happened. Meanwhile the degradation inside the termination continued and caused a breakdown.

7 RECOMMENDATIONS

It is recommended to check the terminations for PD activity, if possible (and over a longer period of time). The check for gasses does only work in case a crack, if any, did open itself during maintenance work and this kind of check is therefore an uncertain diagnostic entity.

It is further recommended to reconsider the commissioning test, such to have a test at higher voltages.

8 REFERENCES

- [1] Alcoa. Fjardaal Smelter Project 336 – Cells @ 365 kA 322.000 mtpy 220 kV metering @ protection S.L.D. Document 310-EM-0310-00001-000-00E, dated April 12, 2005.



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74100470-ETD/AM 11-3153

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- [2] Bechtel. Cable specification "220 kV High Voltage Power Cables and 33 kV High Voltage Cables". Document 24956-310-VIA-EWGO-00030 Rev: 002, dated June 16, 2006.
- [3] Silec Cable. Assembly of connection equipment metal enclosed termination according to CEI 60859 and 62771-209 long (SF6 + ISO + SF6) Um = 245 kV. Document FI.URL 141/1, indice: F, dated March 20, 2009.
- [4] Silec Cable. Termination drawing "Extrémité en caisson de transfo pour cable Um 245 kV écran fil+alu ENDEMBLE". Document BE PL 05404 Rev: A, dated September 15, 2005.
- [5] Silec Cable. Termination legend for [4] "Extrémité en caisson de transfo pour cable Um 245 kV écran fil+alu ENDEMBLE". Document BE NM 05404 Rev: A, dated September 15, 2005.
- [6] Fuji Electric Systems Co. Subject "Investigation report for RF14 Rectifier (Preliminary) based on internal inspection at site. Document IL20080703-01, dated July 3, 2008, rev dated July 22, 2009.
- [7] Fuji Electric Systems Co. Recommendation of DGA intervals after retightening of spacer bushings for rectifiers cable junction boxes [report no. 9], based on the latest DGA dated 2009-09-22. Document IL 20090408-9, dated October 21, 2009.
- [8] Fuji Electric Systems Co. Study of DGA for rectifiers cable junction boxes [report no. 11], based on the latest DGA of RF12-1U1, RF12-1W1 and RF15-1V1 dated 2009-12-03 (the date after about three months operation after retightening). Document IL 20090408-11, dated December 22, 2009.
- [9] Alcoa. Oscillography downloaded from a. protection relay of output feeding rectifier group RF-12 GIS D04-RF12 and b. regulator transformer RF-12 restricted earth fault protection relay TF 87G-51N-RF12 and c. protection relay of Landsnet outputs FL3 & LF4 Fljòtsdalur @ Alcoa. Document: no unique id., Date: unknown but after the incident.
- [10] Alcoa. KKA responses to KEMA requested information. Document: no unique id., Date: unknown but after the incident and in 2011.

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- [11] Alcoa. Information to Silec and Fuji (on loading and temperatures). Document: no unique id, dated February 15, 2011.

- [12] Alcoa. Alcoa Fjardaál, regulating transformer RF12 investigation. Document: no unique id, dated December 30, 2010.

- [13] Alcoa. Alcoa Alcoa Fjardaál, regulating transformer RF12 investigation. Document: no unique id, updated January 3, 2011.

- [14] Alcoa. Alcoa Alcoa Fjardaál, regulating transformer RF12, U, V, W inspection. . Document: no unique id, dated January 10, 2011.

- [15] Alcoa. Witness of fire from Crucible cleaning entrance of Casthouse. Document: no unique id,. Date: unknown but after the incident and in 2011.

- [16] Fuji Electric Systems Co. Investigation result of fire incident on RF12 173.9 MVA voltage regulating transformer – preliminary report / draft. Document: no unique id,. Date: unknown but after the incident and in 2011.

- [17] Kevin Kennedy Associates. Various photo's taken during the investigations between the incident up to April 29, 2011.

- [18] Su, Charles Q. Case study: lessons learned from the failure of a new 230 kV transformer cable termination. IEEE Electrical Insulation Magazine, January / February – Vol. 26. No. 1 2010: 15-19.

- [19] Kevin Kennedy Associates. DGA results in Excel. From an email dated May 1, 2011.

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APPENDIX I DGA RESULTS OVER TIME [19]

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13A Table for DGA Analysis of cable boxes. Yellow highlight indicates gases of concern.
Red highlight is first tests following Fuji Arrester bushing and degassing work.

Fuji found sludge on RF15 V, RF12 U and W. No sludge was found in RF11 or RF13. I do not have the report for RF14

Hydrogen H2			PARTIAL DISCHARGE			138 PPM			14U			15U		
11U	11V	11W	12U	12V	12W	13U	13V	13W	14U	14V	14W	15U	15V	15W
2007-05-02	5	5	5	5	5	5	5	5	5	5	5	5	5	5
2008-04-07	11	63	123	5	63	5	5	5	5	5	5	5	5	5
2008-07-05	10	39	100	5	5	9	5	5	5	5	5	5	5	5
2008-08-06	5	40	95	6	6	16	5	5	5	5	5	5	5	5
2008-09-09	5	12	7	5	8	14	5	5	5	5	5	5	5	5
2008-12-08	5	9	9	12	11	34	5	6	5	5	5	5	5	5
2009-02-24	5	7	6	10	10	22	5	5	5	5	5	5	5	5
2009-03-23	5			12	11	21	5	5	5	5	5	5	5	5
2009-05-04	5	6	5	17	19	23	5	7	5	5	5	5	5	5
2009-08-12	5	8	64	16	8	32	5	5	5	5	5	5	5	5
2009-09-04	5			11	6	21	5	5	5	5	5	5	5	5
2009-12-09				5		39								
2010-01-05	5	5	16	5	5	47	5	5	5	5	5	5	5	5
2010-02-04				5		26								
2010-03-09				5		42								
2010-04-21				5		38								
2010-08-26	5	5	5	5	5	41	5	5	5	5	5	5	5	5
2010-12-19		5												
Comments:														
RF 12 - The 63 PPM must be an error in test														
Methane CH4			OVERHEATING ON			128 PPM			14U			15U		
11U	11V	11W	12U	12V	12W	13U	13V	13W	14U	14V	14W	15U	15V	15W
2007-05-02	0.3	0.2	0.2	0.4	0.5	0.4	0.5	0.6	0.3	0.4	0.4	0.2	0.4	0.2
2008-04-07	0.6	1.4	1.1	1.9	1.2	0.9	0.9	1	0.8	0.8	0.8	0.5	0.5	0.4
2008-07-05	0.8	1.2	0.8	1.1	1.2	0.6	0.6	0.9	1	0.3	0.3	0.3	0.5	0.4
2008-08-06	0.8	2.1	0.8	2.7	1.5	1	1.1	1.4	1.1	0.3	0.3	0.3	0.5	0.4
2008-09-09	1	1.5	0.2	2.1	1.5	0.8	1	1.3	1.1	0.3	0.3	0.3	0.5	0.4
2008-12-08	1	2.3	1.5	3.1	2.1	1.4	1.3	1.7	1	0.8	0.8	0.7	0.8	0.6
2009-02-24	1	2.2	0.9	2.5	1.5	1.5	1	1.8	1.2	1.2	1.1	0.8	1.1	0.6
2009-03-23				2.4	1.8	1						0.9	1	0.7
2009-05-04	0.8	1.9	1.1	3.1	2.1	1	0.9	1.7	1.2	1.3	1	0.8	1	0.7
2009-08-12	1.5	2.8	1.8	3.8	1	1.6	1.2	1.4	1.3	1.3	1.2	1.9	1.5	1.5
2009-09-04				2.3	1.3	1						1.2	0.2	1.1
2009-10-26														
2009-12-09				0.5		43								
2010-01-05	0.4	0.5	0.5	0.4	0.5	47	0.4	0.4	0.4	2	1.2	1.9	0.4	0.3
2010-02-04				1.1		44								
2010-03-09				0.8		47								
2010-04-21				0.4		49								
2010-08-26	2.6	1.1	0.9	3.3	2.7	41	1.8	1.1	0.7	3.2	1	1.6	1.9	0.7
2010-12-19		1.4						1.2			4		0.9	0.6

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CO	OVERHEATING CELL						550 PPM								
	11U	11V	11W	12U	12V	12W	13U	13V	13W	14U	14V	14W	15U	15V	15W
2007-05-02	2	2	2	2	2	2	3	3	5	3	4	4	4	5	3
2008-04-07	6	5	4	10	8	8	7	10	10	7	8	5	10	10	10
2008-07-05	5	10	5	5	10	5	5	10	10	2	7	5	7	10	6
2008-08-06	4	20	5	6	9	7	7	11	8				6	5	8
2008-09-03	8,4	8,7	6,2	6	10	5,7	8,1	11	10	5	8	8	10	10	8
2008-12-08	8,3	15	12	10	15	12	10	15	10	5	6	5	10	15	10
2009-02-24	7	10	6	7	10	10	8	15	8	8	10	7	10	15	8
2009-03-23				6	10	7							10	15	10
2009-05-04	6	10	8	10	15	8	7	15	10	10	10	10	10	15	10
2009-08-12	8,8	13	11,9	10,4	6,3	11,8	12	14,5	11,6	8,2	11	8,2	13	15,4	12,3
2009-09-04				6,5	7,5	7,3							8	6,8	8,1
2009-10-26										11,5	12,1	10			
2009-12-03				7,2		8,2								4,5	
2010-01-05	6,1	7,8	10	6,2	6,7	8,2	5,8	6,4	7,9	10	10	9,2	5,2	4,3	5
2010-02-04				10		10								5	
2010-03-09				7,7		10								5,3	
2010-04-21				10		10								5,8	
2010-08-26	25	25	25	25	30	30	25	25	20	20	20	15	15	11	14
2010-12-19		15						10			15			8	

CO2	OVERHEATING CELL						2500 PPM								
	11U	11V	11W	12U	12V	12W	13U	13V	13W	14U	14V	14W	15U	15V	15W
2007-05-02	35	37	41	38	53	2	52	9	80	46	65	78	61	120	55
2008-04-07	122	139	107	115	115	8	85	10	105	93	121	133	100	125	100
2008-07-05	50	70	45	30	85	5	45	10	70	50	119	89	55	75	55
2008-08-06	140	167	80	95	130	7	100	11	100				65	60	97
2008-09-03	85	90	67	88	130	67	93	130	100	65	65	70	85	105	85
2008-12-08	70	140	115	85	145	95	85	140	75	40	40	40	90	140	95
2009-02-24	78	125	65	75	100	95	80	145	85	60	80	70	100	140	75
2009-03-23				75	125	70							115	135	90
2009-05-04	50	115	70	90	155	70	70	140	90	65	95	80	90	120	85
2009-08-12	135	160	133	115	64	124	116	144	109	95	121	109	140	162	124
2009-09-04				65	205	95							100	110	95
2009-10-26										88	110	85			
2009-12-03				95		115								75	
2010-01-05	90	105	125	65	95	110	80	90	95	70	100	70	90	75	75
2010-02-04				105		120								85	
2010-03-09				125		135								105	
2010-04-21				110		150								115	
2010-08-26	175	190	220	170	195	235	155	185	165	120	155	115	135	125	155
2010-12-19		160						140			140			110	

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Ethylene C2H4				OVERHEATING DEL						SO PPM								
11U	11V	11W		12U	12V	12W		13U	13V	13W		14U	14V	14W	15U	15V	15W	
2007-05-02	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.6	0.1	0.1	0.1	0.1	0.2	0.1
2008-04-07	0.2	0.1	0.2	0.3	0.1	0.1	0.1	0.1	0.1	0.1	0.1	4.1	0.7	0.2	0.1	0.2	0.2	0.1
2008-07-06	0.2	0.2	0.1	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	2.1	4.1	0.1	0.1	0.1	0.1
2008-08-06	0.1	0.1	0.1	0.1	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
2008-09-03	0.1	0.1	0.1	0.3	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.4	0.1	0.1	0.1	0.1
2008-12-08	0.1	0.1	0.1	0.5	0.3	0.2	0.1	0.1	0.1	0.1	0.1	0.5	0.5	0.6	0.2	0.2	0.2	0.2
2009-02-24	0.1	0.2	0.1	0.7	0.3	0.4	0.1	0.1	0.1	0.2	0.1	0.7	0.8	0.7	0.3	0.3	0.2	0.2
2009-03-23	0.1			0.7	0.4	0.2	0.1	0.1	0.1	0.2	0.1	0.6	0.8	0.7	0.3	0.3	0.2	0.2
2009-05-04	0.1	0.2	0.1	0.9	0.5	0.2	0.1	0.1	0.1	0.2	0.1	0.6	0.8	0.7	0.3	0.3	0.2	0.2
2009-08-12	0.2	0.3	0.2	1.1	0.3	0.4	0.1	0.1	0.1	0.2	0.1	0.5	0.5	0.7	0.3	0.3	0.3	0.3
2009-09-04				0.8	0.3	0.2	0.1	0.1	0.1	0.2	0.1	0.5	0.5	0.7	1.2	0.7	0.9	0.9
2009-10-26															0.8	0.1	0.7	0.7
2009-12-03				0.1		3.6						0.5	0.4	0.5				
2010-01-05	0.1	0.1	0.1	0.1	0.1	3.7	0.1	0.1	0.1	0.1	0.1	0.4	0.4	0.4	0.1	0.1	0.1	0.1
2010-02-04				0.1		3.8												
2010-03-09				0.2		3.9												
2010-04-21				0.1		3.7												
2010-08-23	0.1	0.1	0.1	2.4	1	2	0.2	0.1	0.1	0.1	0.1	0.5	0.5	0.4	0.1	0.1	0.1	0.1
2010-12-19		0.1						1.3					0.8			0.1		0.1

Ethane C2H6				SPARKING						SO PPM								
11U	11V	11W		12U	12V	12W		13U	13V	13W		14U	14V	14W	15U	15V	15W	
2007-05-02	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	1.8	0.1	0.1	0.1	0.1	0.1	0.1
2008-04-07	0.1	0.6	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	35	7.1	1.7	0.1	0.1	0.1	0.1
2008-07-06	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.3	18.9	35	0.1	0.1	0.1	0.1
2008-08-06	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1				0.1	0.1	0.1	0.1
2008-09-03	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
2008-12-08	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
2009-02-24	0.2	0.2	0.1	0.7	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
2009-03-23				0.7	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
2009-05-04	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
2009-08-12	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
2009-09-04				0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	1	0.1
2009-10-26															0.1	0.1	0.1	0.1
2009-12-03				0.1		0.3						0.1	0.1	0.2				
2010-01-05	0.1	0.1	0.1	0.1	0.1	0.3	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
2010-02-04				0.1		0.2						0.1	0.1	0.1	0.1	0.1	0.1	0.1
2010-03-09				1.1		3.6												
2010-04-21				0.1		3.1												
2010-08-26	0.1	0.1	0.1	2.4	0.9	3.9	1.6	0.3	0.1	0.1	0.1	1.4	0.2	0.1	0.5	0.1	0.1	0.1
2010-12-19		0.1						1					0.4			0.1		0.1

confidential

Appendix I page 4 of 4

Acetylene C2H2				ARONG			35 PPM											
11U	11V	11W		12U	12V	12W	13U	13V	13W	14U	14V	14W	15U	15V	15W			
2007-05-02	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	4.4	0.1	0.1	0.1	1.3	0.2			
2008-04-07	0.1	0.1	0.1	1.2	0.2	0.7	0.1	0.1	0.1	3.9	4.6	1.2	0.7	0.5	0.4			
2008-07-06	0.1	0.1	0.1	0.7	0.6	0.6	0.1	0.1	0.1	0.2	8.2	3	0.7	0.9	0.4			
2008-08-06	0.1	0.1	0.1	1.2	0.6	1	0.1	0.1	0.1				0.5	0.3	0.5			
2008-09-03	0.1	0.1	0.1	1.1	0.7	0.7	0.1	0.1	0.1	0.1	0.1	3	0.7	0.7	0.1			
2008-12-08	0.1	0.1	0.1	2	0.8	1	0.1	0.1	0.1	0.2	0.1	0.1	0.8	0.9	0.5			
2009-02-24	0.1	0.1	0.1	5.5	0.8	1	0.1	0.2	0.1	0.3	0.3	0.3	0.9	1.1	0.5			
2009-03-23				3.5	1.2	0.7							1.1	1.1	0.7			
2009-05-04	0.1	0.1	0.1	4.6	1.5	0.8	0.1	0.1	0.1	0.3	0.3	0.3	0.9	1	0.7			
2009-08-12	0.1	0.1	0.1	5.3	0.9	1.6	0.1	0.1	0.1	0.3	0.2	0.3	9.6	6.2	7.6			
2009-09-04				5.4	1.2	1.1							7.9	0.1	7.3			
2009-10-26										0.2	0.1	0.1						
2009-12-03				0.1		10.3									0.2			
2010-01-05	0.1	0.1	0.1	0.1	0.4	10.3	0.1	0.1	0.1	0.2	0.1	0.1	0.1	0.3	0.1			
2010-02-04				0.1		9.3								0.6				
2010-03-09				0.2		10.1								0.4				
2010-04-21				0.2		10.1								0.4				
2010-08-26	0.1	0.1	0.1	0.7	2.4	7.7	0.1	0.1	0.1	0.2	0.2	0.1	0.3	0.3	0.2			
2010-12-19		0.1						0.1			0.1			0.3				
TCS																		
11U	11V	11W		12U	12V	12W	13U	13V	13W	14U	14V	14W	15U	15V	15W			
2007-05-02	1	0	1	1	1	1	2	2	1	22	1	1	0	6	1			
2008-04-07	12	65	131	7	3	5	4	3	3	835	38	24	6	8	5			
2008-07-06	12	40	100	5	7	10	3	4	4	2	228	1838	7		5			
2008-08-06	3	43	36	11	8	19	6	7	5				6	14	9			
2008-09-03	6	13	8	9	10	16	4	5	4	3	2	3	7	5	1			
2008-12-08	3	11	11	18	15	37	6	8	5	3	2	2	12	12	5			
2009-02-24	4	10	6	16	12	25	5	6	7	6	7	7	10	14	5			
2009-03-23				29	15	23							13	13	9			
2009-05-04	3	9	7	26	17	25	5	9	7	6	5	6	13	12	9			
2009-08-12	7	12	9	26	10	36	7	5	6	3	8	8	45	214	37			
2009-09-04		20		13	11	24							36	1	35			
2009-10-26										3	2	2						
2009-12-03				1		50								1				
2010-01-05	1	1	1	1	3	56	1	2	2	4	4	4	1	2	1			
2010-02-04				2		55								2				
2010-03-09				5		62								6				
2010-04-21				1		54								2				
2010-08-26	6	2	2	11	21	56	4	7	1	8	4	4	3	3	6			
2010-12-19		7						9			10			3				

EXHIBIT C4

REQUEST FOR ARBITRATION



KEVIN KENNEDY ASSOCIATES

**PROFESSIONAL ENGINEERING REPORT No. 2
RF12 RECTIFIER ELECTRICAL FAULT AND FIRE
ALCOA FJARDAAL
REYDARFJORDUR, ICELAND**

Kevin Kennedy Associates Report No. 110520

Prepared for:

Alcoa Inc.

Authors:

*Beth Anderson, P.E.
Mark Lautenschlager, P.E.*

Date:

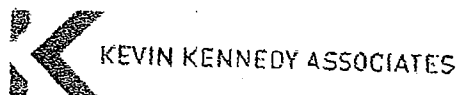
May 20, 2011

This work was performed pursuant to Kevin Kennedy Services Agreement #11010403 between Kevin Kennedy Associates Inc. and Alcoa. This report has been prepared for Alcoa and only for Alcoa and shall not be relied upon by any other person.

Respectfully submitted,

*/s/ Beth Anderson
/s/ Mark Lautenschlager*

C O N F I D E N T I A L



INTRODUCTION

In its report dated March 4, 2011, Kevin Kennedy Associates provided opinions on the origin and cause of the December 18, 2010, Alcoa Fjardaal RF12 oil-fueled fire. That report provided the opinion that an electrical fault within the W-Phase 220000-volt termination caused the fire.

This report provides an opinion regarding the cause of the electrical fault within the termination.

On April 29, 2011, Beth Anderson and Mark Lautenschlager of Kevin Kennedy Associates along with representatives of Alcoa, Silec Cable, Fuji Electric, and KEMA conducted an examination of the artifacts retained from the loss site. Participants in this examination included:

Alcoa: Sigmundur Jonsson

KEMA: Dr. Fred Steennis

Silec: Pierre Gofflo

CET Risques ELECTrotechniques: Yves Boulanger

Fuji Electric: Kazuhiro Muto

Japan AE Power Systems Corporation: Keizo Kawanishi; Akira Matsuyama

Kevin Kennedy: Beth Anderson, PE; Mark Lautenschlager, PE

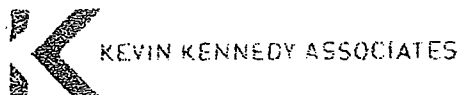
The artifact inspection included examination and cleaning of the cable boxes, microscopic examination and cleaning of the arc pattern on the W-phase cable, reconstruction of the W-phase cable for investigation of the arc pattern,¹ microscopic examination and cleaning of the electrical tracking patterns on the insulator pieces, and destructive inspection of the stress cone looking for electrical tracking patterns within the stress cone material.²

In addition to the artifact inspection, Kevin Kennedy Associates completed a detailed analysis of the Dissolved Gas Analysis (DGA) data that were collected from the cable boxes from all five rectifier regulating transformers over their operational life from commissioning through the date of the accident.

All parties discussed the artifacts and possible causes of the electrical fault in the W-phase termination. The areas of expertise brought to this discussion included cable design and

¹ The arc pattern is located on the W-phase conductor at 37 cm from the top of the sealing ring as noted in the Kevin Kennedy Associates March 4, 2011 report. This is the same location noted in the KEMA report as 58 cm from the top of the cable crimp pin. Mechanical distortion in the conductor was straightened to better determine if copper was consumed by an arc, and to identify that only outer strands were involved.

² Photographs taken at the April 29, 2011 inspection are available upon request.



operation, cable termination design and operation, transformer design and operation, high-voltage failure modes, and fire origin and cause analysis. The following Kevin Kennedy Associates opinions are consistent with all of the known facts surrounding the electrical fault and subsequent fire.

Kevin Kennedy Associates has reviewed the report of independent expert Fred Steennis of KEMA and is in general agreement with his findings regarding the cause of the electrical fault.

I. OPINIONS AND BASES

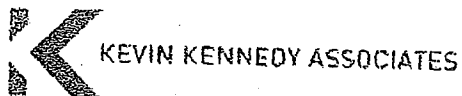
See Kevin Kennedy Associates March 4, 2011 report for opinions #1 and #2.

Opinion #3: Electrical Fault Cause

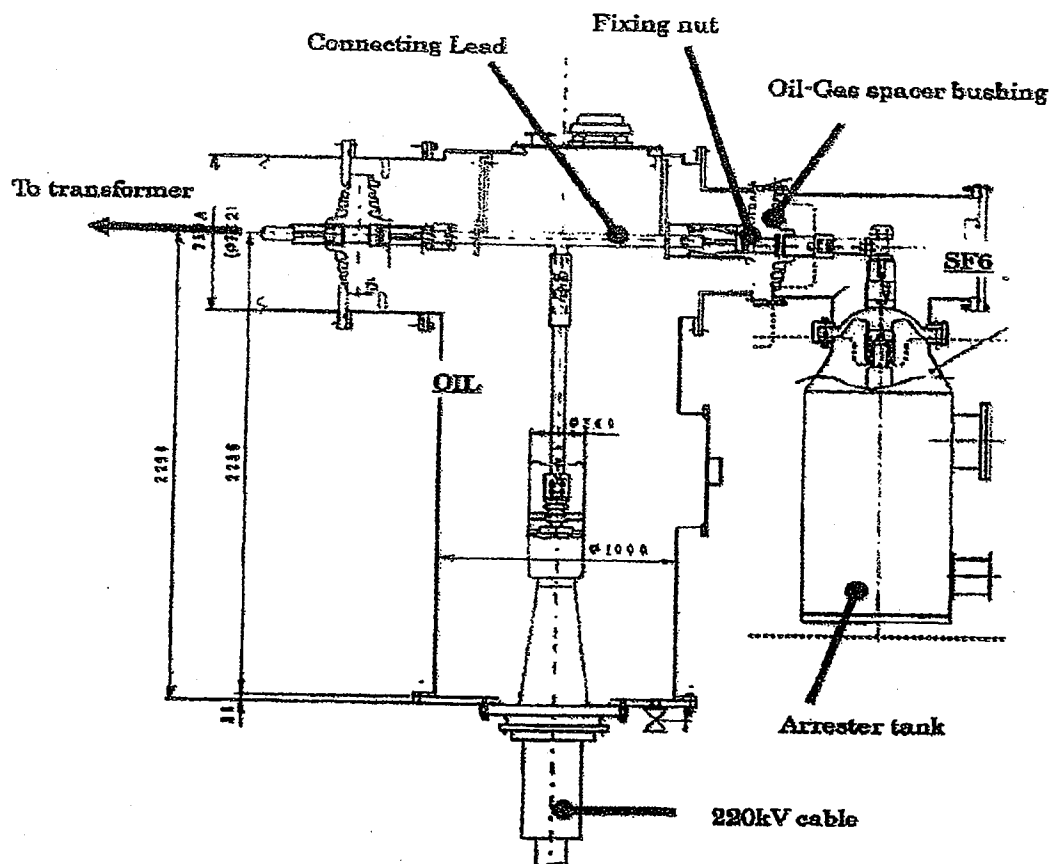
It is our opinion, to a reasonable degree of engineering certainty, that a crack in the W-Phase cable termination insulator led to the conditions that caused the electrical arc, and that the termination insulator was defective when the termination was installed by Silec Cable.

Although the insulator was broken into many pieces and any physical evidence of a crack was destroyed, an insulator crack explains the conditions that produced the partial discharge activity required to generate the electrical tracking on the surface of the termination insulator (physical evidence). The conclusion that the insulator was defective when installed is based on (1) the knowledge that generating the degree of partial discharge-caused electrical tracking observed on the insulator takes many months, and (2) the fact that the stable level of partial discharge-caused combustible gases measured in the cable box oil, subsequent to the Fuji Electric repair work, had to be generated from within the termination prior to that work and drawn from the termination during follow up vacuum drying; and not generated from within the cable box.

For illustrative purposes, the following diagram shows the configuration of the cable box, termination, and lightning arrester.



Internal Construction of 220 kV Cable Junction BOX

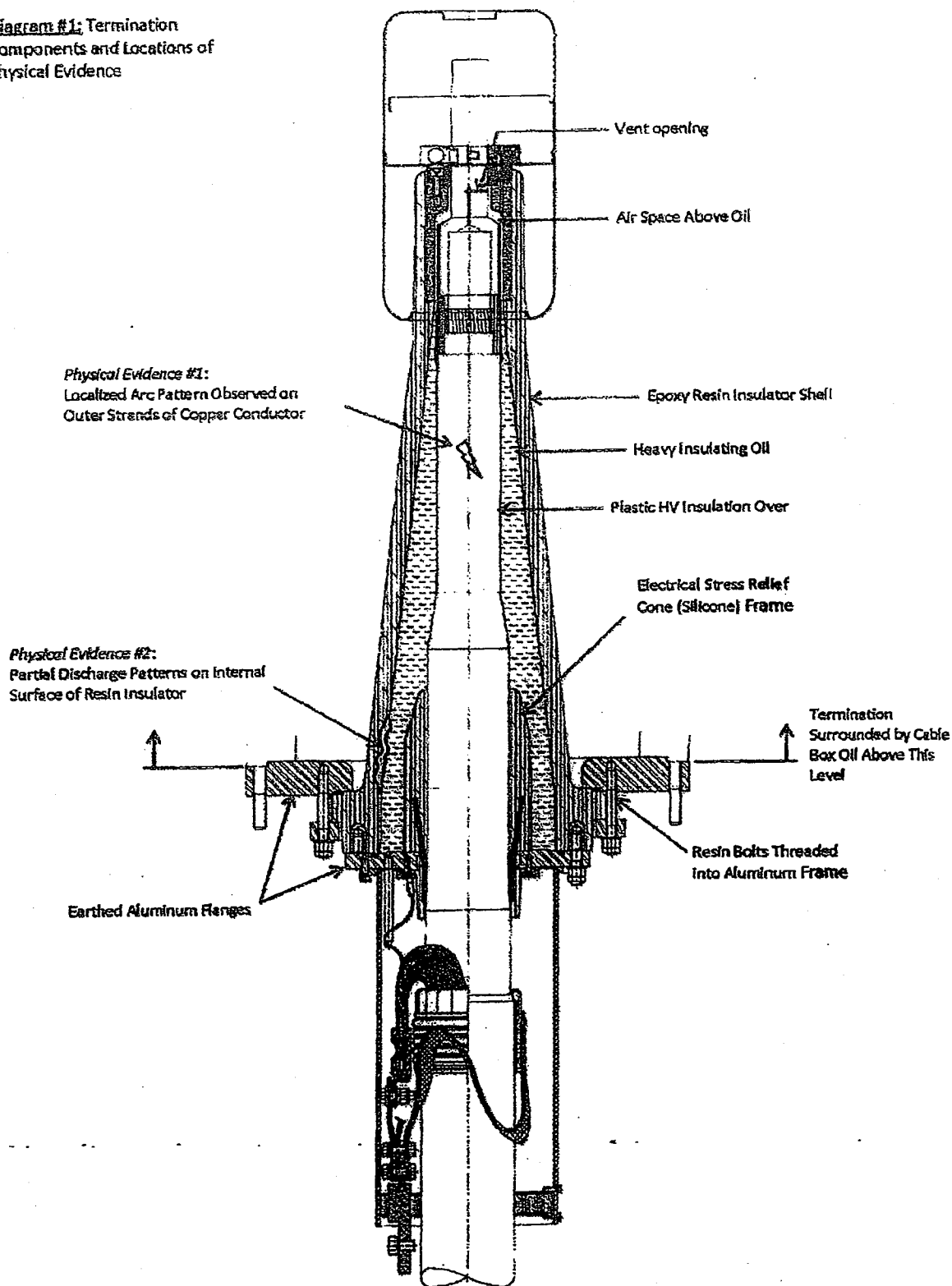


Bases/Analysis for Opinion #3:

- A. See Diagrams #1 and #2 on the following pages for a graphic discussion of the termination failure.



Diagram #1: Termination Components and Locations of Physical Evidence



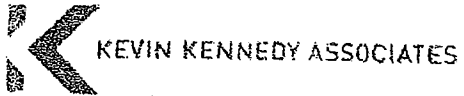
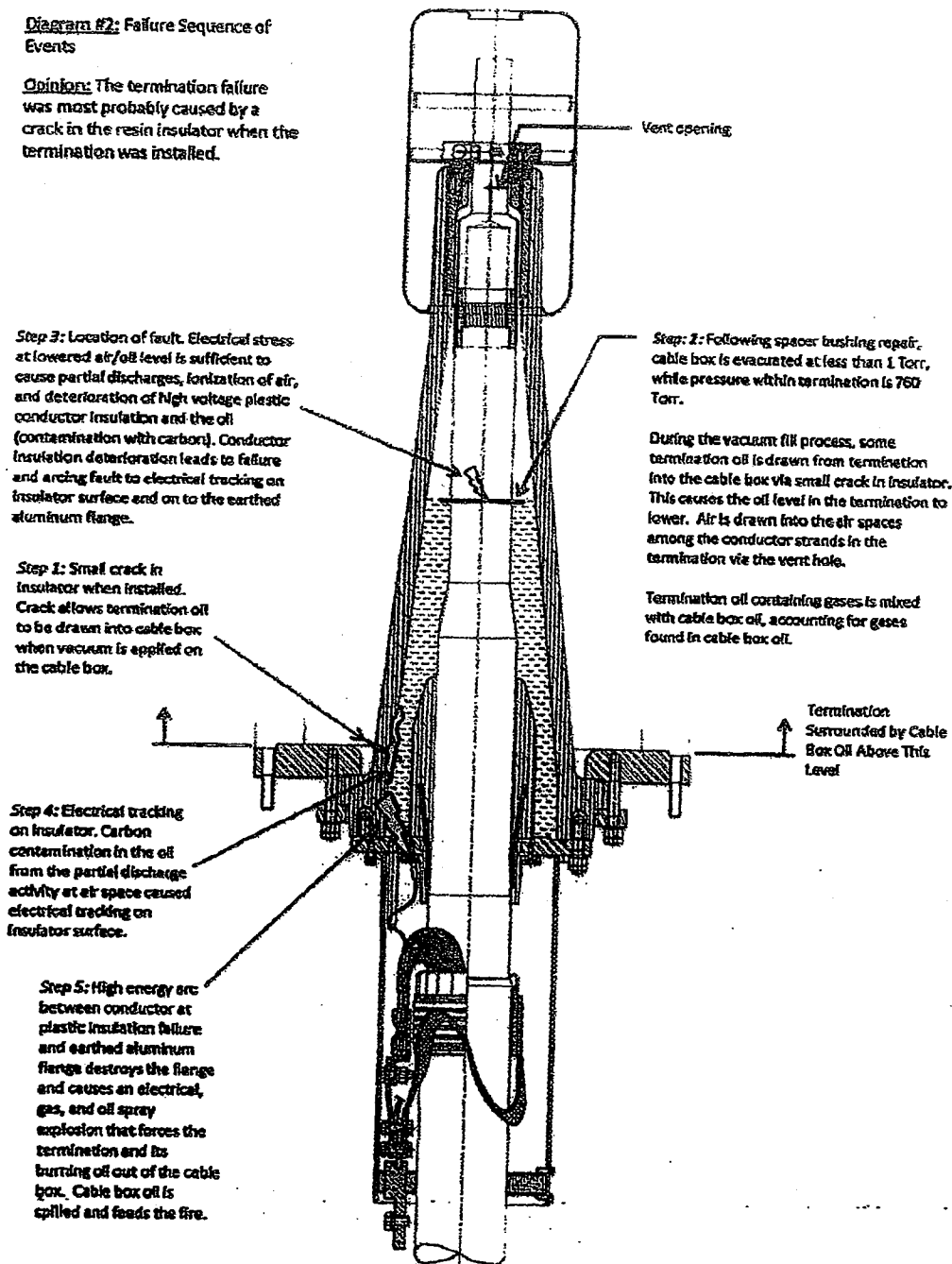
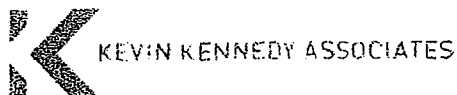


Diagram #2: Failure Sequence of Events

Opinion: The termination failure was most probably caused by a crack in the resin insulator when the termination was installed.





- B. Our general opinion is that the insulator crack allowed some termination oil to be drawn into the cable box when vacuum was applied to it. This occurred twice when the termination was tested and prepared for service in 2007, and once again when the Fuji Electric repair work on the arrester spacer bushing was done in 2009. The crack allowed the oil level in the termination to lower each time vacuum was applied to the cable box. The lowered oil level was followed down by air drawn in from the conductor air spaces via the vent passage. The lower oil level and the presence of air caused partial discharge activity to occur within the termination which

(1) deteriorated the termination oil and contaminated the oil with carbon causing the electrical tracking on the insulator,

(2) deteriorated the plastic high voltage conductor insulation in the termination until the insulation eventually failed,

(3) generated combustible gases in the termination oil and air, and

(4) ionized the air (making it more conductive) in the termination.

The contamination of the oil by the effects of partial discharge accounts for the electrical tracking on the termination insulator. Partial discharge activity in the air at the high voltage conductor insulation accounts for the deterioration and failure of the insulation. The generation of combustible gases in the termination accounts for the slightly elevated, but stable, gas levels measured in the cable box subsequent to the Fuji Electric repair work.³ The reduction in the dielectric strengths⁴ of the oil, the air, and the insulator surface, accounts for the arcing fault which occurred when the high voltage conductor insulation failed. The following steps (also, see Diagram #2) discuss the details of the events leading up to the arc event.

- C. In 2007, vacuum was applied for about 24 hours on the cable box before the cable and the termination were test energized. Vacuum was again applied following the connection of the T-bus to the termination, after the test. This caused some of the heavy oil in the termination⁵ to be drawn from the termination into the cable box, via the crack.

³ See Tabulation of Gas Results, Attachment G.

⁴ Dielectric strength indicates the ability of a material to withstand voltage.

⁵ The termination contains 9-10 liters, total.



This oil leakage occurred because the pressure in the termination was much higher, about 760 Torr (atmospheric pressure), than the pressure outside of the termination, which was less than 1 Torr. An air vent channel in the termination between the small air space at the very top of the termination and the air space within the cable allowed air from the conductor to be drawn into the termination.

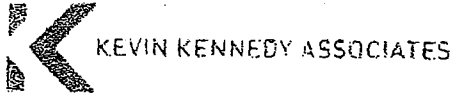
There were no means to measure the oil level in the termination after it was installed. Applying vacuum to the cable box was a normal and necessary procedure to dry out the Kraft paper insulation in the cable box. If the insulator was not cracked, applying the vacuum would not have caused oil to be drawn into the cable box from the termination.

- D. When the cable/termination assembly was energized in 2008, the air in the termination became electrically overstressed and began disassociating, causing partial discharges⁴ and some sparking and heating of the oil,⁷ particularly in the high stress area in the air,⁸ where the termination conductor insulation and the lowered oil level met. With time, partial discharge activity deteriorated the oil, contaminating it with carbon. The partial discharge activity also deteriorated the plastic high voltage conductor insulation leading to the eventual failure of that insulation. Kevin Kennedy Associates found physical evidence of an arc pattern on the termination conductor, indicating insulation failure. The partial discharge activity also ionized the air, making the air more conductive, and it also generated combustible gases in the oil. These gases were generated by the heating effect and molecular disassociation of the oil by the partial discharge activity, and from sparking.

⁴ Partial discharges (PD) are electric pulses on and in an insulator that stop at each current zero and don't complete a circuit. PD destroys some types of insulation, creates conductive and combustible gases in air or oil, and causes conductive "tree-shaped" tracking paths on insulator surfaces. Partial discharge activity occurs when air is electrically overstressed and air molecules break up into negatively and positively charged elements. Some negatively-charged electrons mix with the air (ionization) making the air more conductive as the ions travel back and forth in the alternating electric field. Ionization sometimes can be observed as "corona discharges," which generate radio frequency noise. If ionization is sufficiently intense, the short, lower energy "partial discharge" paths cause intermittent sparking which eventually leads to a long "complete discharge" path, causing a high energy arc. Other electrons bond with oxygen in the air to form ozone, which reacts with some materials, such as rubber. The positively-charged protons also travel back and forth in the electric field and have sufficient mass to bombard and break apart insulation material molecules, causing electrical tracking and deterioration on and within the material (reducing the ability of the material to insulate). An arc occurs when the combined dielectric strength of all materials (air, oil, and solid) between the energized and earthed potentials is sufficiently reduced by the partial discharge activities.

⁷ This is indicated by the types of gases found in the cable box oil:

⁸ The termination was designed to exclude air from areas of the insulation system exposed to high electrical stress. Air has a lower dielectric constant than oil, plastic, and epoxy resin, causing excessive electric stress and partial discharges in air near or within the other types of insulation.



- E. The reduced dielectric strength of the contaminated oil overstressed the oil along the insulator surface, causing the formation of the partial discharge (electrical) tracking on the insulator surface. Kevin Kennedy Associates found physical evidence of this electrical tracking on the insulator surface. This conductive tracking effectively reduced the physical distance on the insulator surface (known as creepage distance) between the energized top cap and the earthed bottom flange. As the distance shortened, the electrical stress along the remaining surface increased, causing even more partial discharge activity. The tree-shaped patterns observed on the insulator pieces were typical physical evidence of partial discharge occurring over a time period of many months.
- F. High levels of combustible gases were generated in the termination from the partial discharge activity, and from sparking, in the termination during the year or so between the energizing of the termination and when Fuji Electric and Alcoa applied vacuum to the cable box for the third time in 2009 (following the repair to the arrester spacer bushing). The applied vacuum drew more termination oil, now containing containing high levels of combustible gases, via the crack, into the cable box. These gases were diluted by the large amount of cable box oil and gas levels remained stable until the termination failed.⁹ The gas levels in the cable box did not increase because gas-containing termination oil was drawn into the box only during the application of vacuum following the Fuji Electric bushing repair work. If the crack was not present before the Fuji Electric work, no gases would have been measured in the cable box oil following the work. Therefore, the crack was not caused by Fuji Electric.
- G. Since the termination oil level was even lower during the year or so following the spacer bushing repair work, partial discharge activity in the air and oil, on the insulator surface, and on the conductor insulation not only continued, but increased. The combination of the reduced insulator, oil, and air dielectric strengths, that is, the reduced ability to insulate, increased the electrical stress on the conductor's plastic high voltage insulation, which was also being deteriorated by the partial discharge action. Ultimately, the conductor insulation failed, and the electrically weak air and oil could not withstand the increased voltage across them when the conductor insulation failed, resulting in a complete high energy discharge (an arcing fault) from the conductor to the conductive tracking on the termination insulator, and on to the earthed flange.
- H. The expansion of the air and oil in the termination by the heat of the arc resulted in a mechanical explosion which forced the termination insulator, oil, and combustible gases in the oil, out through the opening created in the bottom flange by the arcing event. The resulting hot oil spray and combustible gases exploded (a chemical reaction

⁹ According to tabulation and analysis of dissolved gas history for all RF cable boxes, Attachment G.



KEVIN KENNEDY ASSOCIATES

explosion) into the atmosphere. Subsequently, cable box oil was forced out by the mechanical explosion and fed the fire that eventually destroyed the RF12 equipment.

- I. Fuji Electric's cable box pressure relief device design and application did not contribute to the fire. The cable box relief device was designed to contain an arc-caused mechanical (heat) explosion only if the arc did not burn a large opening to the atmosphere. In this case, the arc penetrated the termination flange and extended into the atmosphere, burning away some of the flange material, and igniting the secondary oxygen-fed chemical explosion that started the fire.

These opinions are based on work performed to date.

KKA Table for DGA Analysis of cable boxes. Yellow highlight indicates gases of concern. Red highlight is first tests following Fuji Arrester bushing and degassing																
Fuji found sludge on RF15 V, RF12 U and W. No sludge was found in RF11 or RF13. I do not have the report for RF14																
Hydrogen	H2	11U	11V	11W	12U	12V	12W	PARTIAL DISCHARGE	100 PPM	13U	13V	13W	14U	14V	14W	15U
2007-05-02		5	5	5	5	5	5	5		5	5	5	12	5	5	5
2008-04-07		11	63	129	5	63	5	5		5	5	5	300	54	14	5
2008-07-06		10	39	100	5	5	5	9		5	5	5	805	158	825	5
2008-08-06		5	40	35	6	6	6	16		5	5	5				5
2008-09-03		5	12	7	5	8	8	14		5	5	5	5	5	5	7
2008-12-08		5	9	9	12	11	11	34		5	5	5	5	5	5	7
2009-02-24		5	7	5	10	10	10	22		5	5	5	5	5	5	8
2009-03-23		5			12	11	11	21								6
2009-05-04		5	6	5	17	13	13	23		5	7	5	5	5	5	7
2009-08-12		5	8	64	16	8	8	32		5	5	5	1	6	5	7
2009-09-04			5		11	8	8	21				5				26
2009-12-03					5			33					5	5	5	
2010-01-05		5	5	5	5	5	5	37		5	5	5	5	5	5	5
2010-02-04					5			36								
2010-03-09					5			42								5
2010-04-21					5			39								
2010-08-26		5	5	5	5	5	5	41		5	5	5	5	5	5	5
2010-12-19			5									5		5		
Comments:																
RF 12 - The 63 PPM must be an error in testing																
Methane	CH4	11U	11V	11W	12U	12V	12W	OVERHEATING OIL	120 PPM	13U	13V	13W	14U	14V	14W	15U
2007-05-02		0.3	0.2	0.2	0.4	0.5	0.4			0.5	0.8	0.3	3	0.4	0.4	0.2
2008-04-07		0.6	1.4	1.1	1.9	1.2	0.8			0.9	1	0.8	685	27	7.3	0.4
2008-07-06		0.8	1.2	0.8	1.1	1.2	0.6			0.6	0.9	1	0.3	42	144	0.4
2008-08-06		0.8	2.1	0.8	2.7	1.5	1			1.1	1.4	1.1				0.5
2008-09-03		1	1.5	0.7	2.1	1.5	0.8			1	1.3	1.1	0.5	0.3	0.5	0.4

C4.0011

	2008-12-08	1	2.3	1.5	3.1	2.1	1.4	1.3	1.7	1	0.8	0.6	0.8	0.7	0.8	0.6
	2009-02-24	1	2.2	0.9	2.5	1.5	1.5	1	1.8	1.2	1.2	1.1	1.4	0.8	1.1	0.6
	2009-03-23				2.4	1.8	1							0.9	1	0.7
	2009-05-04	0.8	1.9	1.1	3.1	2.1	1	0.9	1.7	1.2	1.3	1	1.4	0.8	1	0.7
	2009-08-12	1.5	2.8	1.8	3.8	1	1.6	1.2	1.4	1.3	1.3	1.2	1.5	1.9	7.5	1.5
	2009-09-04				2.3	1.3	1							1.2	0.2	1.1
	2009-10-26															
	2009-12-03				0.5		4.9									
	2010-01-05	0.4	0.5	0.5	0.4	0.5	4.7	0.4	0.4	0.4					0.4	
	2010-02-04				1.1		4.8								0.4	0.3
	2010-03-09				0.8		4.7									0.6
	2010-04-21				0.4		4.9									0.5
	2010-08-26	2.6	1.1	0.9	3.3	2.7	4.1	1.8	1.1	0.7	3.2	1	1.6	1.9	0.7	0.6
	2010-12-19		1.4						1.2			4			0.9	
CO																
		11U	11V	11W	12U	12V	12W	13U	13V	350 PPM	14U	14V	14W	15U	15V	15W
	2007-05-02	2	2	2	2	2	2	3	3	5	3	4	4	4	5	3
	2008-04-07	6	5	4	10	8	8	7	10	10	7	8	5	10	10	10
	2008-07-06	5	10	5	5	10	5	5	10	10	2	7	5	7	10	6
	2008-08-06	4	20	5	6	9	7	7	11	8				6	5	8
	2008-09-03	8.4	8.7	6.2	6	10	5.7	8.1	11	10	5	8	8	10	10	8
	2008-12-08	8.3	15	12	10	15	12	10	15	10	5	6	5	10	15	10
	2009-02-24	7	10	6	7	10	10	8	15	8	8	10	7	10	15	8
	2009-03-23				8	10	7							10	15	10
	2009-05-04	6	10	8	10	15	8	7	15	10				10	15	10
	2009-08-12	8.8	13	11.9	10.4	6.3	11.8	12	14.5	11.6	10	10	10	10	15	10
	2009-09-04				6.5	7.5	7.3				8.2	11	8.2	13	15.4	12.3
	2009-10-26										11.5	12.1	10	8	6.8	8.1
	2009-12-03				7.2		8.2									
	2010-01-05	6.1	7.8	10	6.2	6.7	8.2	5.8	6.4	7.9	10	10	9.2	3.2	4.3	5
	2010-02-04				10		10									
	2010-03-09				7.7		10								5	
	2010-04-21				10		10								5.3	
	2010-08-26	25	25	25	25	30	30	25	25	20	20	20	15	15	11	14
	2010-12-19		15						10		15				8	

C4.0012

CO2	OVERHEATING CELLULOSE				2500 PPM				50 PPM				OVERHEATING OIL				C2H4			
	11U	11V	11W	12U	12V	12W	13U	13V	13W	14U	14V	14W	15U	15V	15W	16U	16V	16W	17U	17V
2007-05-02	35	37	41	38	53	2	52	3	80	48	65	78	61	120	55					
2008-04-07	122	139	107	115	115	8	85	10	105	98	121	103	100	125	100					
2008-07-06	50	70	45	30	85	5	45	10	70	50	113	89	55	75	55					
2008-08-06	140	167	80	95	130	7	100	11	100				65	60	97					
2008-09-03	85	90	67	88	130	67	93	130	100	65	65	70	85	105	85					
2008-12-08	70	140	115	85	145	95	85	140	75	40	40	40	90	140	95					
2009-02-24	78	125	65	75	100	95	80	145	85	60	80	70	100	140	75					
2009-03-23				75	125	70							115	135	90					
2009-05-04	50	115	70	90	135	70	70	140	90	65	95	80	90	120	85					
2009-08-12	136	160	133	115	64	124	116	144	109	95	121	100	140	162	124					
2009-09-04				85	105	95							100	110	95					
2009-10-26										88	110	85								
2009-12-03				95		115														
2010-01-05	90	105	125	85	95	110	80	90	95	70	100	70	50	75	75					
2010-02-04				105		120								85						
2010-03-09				125		135								105						
2010-04-21				110		150								115						
2010-08-26	175	190	220	170	195	255	155	185	165	120	155	115	135	125	155					
2010-12-19		160						140			140			110						
Ethylene																				
2007-05-02	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.6	0.1	0.1	0.1	0.2	0.1					
2008-04-07	0.2	0.1	0.2	0.3	0.1	0.1	0.1	0.1	0.1	4.1	0.7	0.2	0.1	0.2	0.1					
2008-07-06	0.2	0.1	0.1	0.2	0.2	0.1	0.1	0.1	0.1	0.1	1.1	4.1	0.1	0.1	0.1					
2008-08-06	0.1	0.1	0.1	0.4	0.2	0.2	0.1	0.1	0.1				0.1	0.1	0.1					
2008-09-03	0.1	0.1	0.1	0.3	0.2	0.2	0.1	0.1	0.1	0.2	0.2	0.4	0.1	0.1	0.1					
2008-12-08	0.1	0.1	0.1	0.5	0.3	0.2	0.1	0.1	0.1	0.5	0.5	0.5	0.2	0.2	0.2					
2009-02-24	0.1	0.2	0.1	0.7	0.3	0.4	0.1	0.1	0.2	0.7	0.8	0.7	0.3	0.3	0.2					
2009-03-23	0.1			0.7	0.4	0.2							0.3	0.3	0.2					
2009-05-04	0.1	0.2	0.1	0.9	0.5	0.2	0.1	0.1	0.2	0.6	0.8	0.7	0.3	0.3	0.3					
2009-08-12	0.2	0.3	0.2	1.1	0.3	0.4	2	0.1	0.2	0.5	0.5	0.7	1.2	6.7	0.9					
2009-09-04				0.8	0.3	0.2							0.8	0.1	0.7					

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2008-07-06	0.1	0.1	0.1	0.1	0.1	0.6	0.7	0.6	0.6	0.1	0.1	0.1	0.1	0.2	8.2	3	0.7	0.9	0.4
2008-08-06	0.1	0.1	0.1	0.1	0.1	1	1.2	0.6	1	0.1	0.1	0.1	0.1	0.5	0.3	0.5	0.5	0.3	0.5
2008-09-03	0.1	0.1	0.1	0.1	0.1	0.7	1.1	0.7	0.7	0.1	0.1	0.1	0.1	0.7	0.7	0.1	0.7	0.7	0.1
2008-12-08	0.1	0.1	0.1	0.1	0.1	1	2	0.8	1	0.1	0.1	0.1	0.1	0.8	0.9	0.5	0.8	0.9	0.5
2009-02-24	0.1	0.1	0.1	0.1	0.1	1	3.3	0.8	1	0.1	0.2	0.1	0.1	0.9	1.1	0.5	0.9	1.1	0.5
2009-03-23						0.7	3.5	1.2	0.7					1.1	1.1	0.7	1.1	1.1	0.7
2009-05-04	0.1	0.1	0.1	0.1	0.1	0.8	4.6	1.5	0.8	0.1	0.1	0.1	0.1	0.9	1	0.7	0.9	1	0.7
2009-08-12	0.1	0.1	0.1	0.1	0.1	1.6	5.3	0.9	1.6	0.1	0.1	0.1	0.1	9.8	62	7.8	9.8	62	7.8
2009-09-04						1.1	3.4	1.2	1.1					7.9	0.1	7.3	7.9	0.1	7.3
2009-10-26																			
2009-12-03						10.3	0.1		10.3										
2010-01-05	0.1	0.1	0.1	0.1	0.1	0.4	0.1	0.4	0.3	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.3	0.1
2010-02-04						9.9	0.1		9.9										
2010-03-09						10.1	0.2		10.1										
2010-04-21						10.1	0.2		10.1										
2010-08-26	0.1	0.1	0.1	0.1	0.1	7.7	0.7	2.4	7.7	0.1	0.1	0.1	0.1	0.2	0.2	0.1	0.3	0.3	0.2
2010-12-19		0.1									0.1				0.1				
TCG																			
2007-05-02	11U	11V	11W	11U	11V	11W	12U	12V	12W	13U	13V	13W	14U	14V	14W	15U	15V	15W	
2008-04-07	12	65	131	1	0	1	1	1	1	2	2	1	22	1	1	0	6	1	
2008-07-06	11	40	100	5	7	7	5	3	5	4	3	3	899	98	24	8	8	5	
2008-08-06	3	43	36	11	8	8	11	8	19	6	7	5	2	220	1038	7	14	9	
2008-09-03	6	13	8	9	10	16	9	10	16	4	5	4	3	2	3	7	5	1	
2008-12-08	3	11	11	18	15	37	18	15	37	6	8	5	3	2	2	12	12	5	
2009-02-24	4	10	6	16	12	25	16	12	25	5	6	7	6	7	7	10	14	5	
2009-03-23				19	15	23	19	15	23							13	13	9	
2009-05-04	3	9	7	26	17	25	26	17	25	5	9	7	6	5	6	13	12	9	
2009-08-12	7	12	9	26	10	36	26	10	36	7	5	6	3	8	8	45	214	37	
2009-09-04		20		18	11	24	18	11	24							36	1	35	
2009-10-26																			
2009-12-03				1		53	1		53										
2010-01-05	1	1	1	1	3	56	1	3	56	1	2	2	4	4	4	1	2	1	
2010-02-04				2		55	2		55									2	
2010-03-09				5		62	5		62									6	

C4.0015

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EXHIBIT C5

REQUEST FOR ARBITRATION



Montereau-Fault-Yonne, April 12, 2012

Jose Ramon Camino
Alcoa Europe SA
Avenue Giuseppe Motta 31-33
CH-1202 Geneva Switzerland

Sent by electronic mail + Registered letter with return receipt requested

Re: December 2010 Transformer Fire at Alcoa's Fjardaal Smelter Project

Dear Mr. Camino:

Thank you for your letters of 16 March 2012 and 23 March 2012 and the extension of time. We have taken the time during the extension to review the file, including the various contracts.

As you know, Silec Cable has denied and continues to deny any liability for the transformer fire at Alcoa's smelter facility in Iceland. We understand Alcoa to be claiming that the fire was caused by the cracking of the epoxy insulator during the installation by Silec Cable. The installation was covered by a separate stand alone agreement between Alcoa's agent, Bechtel and Silec Cable, which was effective 11 August 2006 (Construction Services Order). The installation was not done pursuant to the purchase contract. The installation agreement has its own special conditions as modified including, but not limited to, warranty, indemnity and liability cap.

The installation agreement, unlike the purchase contract, does not contain any agreement to arbitrate or mediate disputes or claims. Thus, Silec Cable does not have to confirm or waive either mediation or arbitration because it is not required.

If you wish to discuss this letter or any of the above, let us know.

Sincerely,

Emmanuel DAVID
Legal Advisor



EXHIBIT B

Bechtel International, Inc. (Icelandic Branch)

Fjarðaál Smelter Project

CONSTRUCTION SERVICES ORDER

Contractor:	SILEC CABLE	Contract No.:	24956-000-FC4-EWU2-00001
Address:	Rue de Varennes Prologee 77876 Montereau Cedex France	Work Location:	Reyðarfjörður, Iceland
		Issuing Office:	Bechtel International, Inc. (Iceland Branch)
Contact:	Hamid Hakimi-Tabrizi	Address:	Somastadir 730 Reyðarfjörður, Iceland
Telephone:	+ 33 (0)1 60 57 30 00		
Facsimile:	+ 33 (0)1 60 57 30 15	Goods and Services Code:	EWU2

This Contract is effective as of the 11th day of August 2006, between Fjarðaál sf (OWNER), acting through its agent Bechtel International Inc. (Iceland Branch) (BECHTEL), and the above named CONTRACTOR who hereby agree that all Work specified below shall be performed by the CONTRACTOR in accordance with all provisions of this Contract consisting of the following Contract Documents:

Contract Form of Agreement
Exhibit "A" General Conditions, dated: 29th September 2006
Exhibit "B" dated: 29th September 2006
Exhibit "C" Schedule of Quantities and Prices, dated: 29th September 2006
Exhibit "D" Scope of Work, dated: 29th September 2006

1. WORK TO BE PERFORMED (Work): CONTRACTOR shall, assuming all risks in any way connected therewith and furnishing all required equipment, materials, labor, and technical and professional services, perform the following described work:
2. **HV Termination and Supervision of Cable Pulling**
SCHEDULE:
 Commencement Date: Cable Pulling Commencement Date: 6th 12th September 2006
 Estimated Termination Commencement Date: 9th October 2006
 Completion Date: Estimated Cable Pulling Completion Date: ~~20th October~~ 4th November 2006
 Estimated Termination Completion Date: 22nd December 2006 for 33 kV
30th January 2007 for 220 kV
3. **COMPENSATION:** As full consideration for the satisfactory performance by CONTRACTOR of this Contract, OWNER shall pay CONTRACTOR compensation in accordance with the prices set forth in Exhibit "C" and the payment provisions of this Contract.
4. **INVOICING:** CONTRACTOR shall submit all invoices, in form and format directed by BECHTEL, in original and two (2) copies to:
 Invoice made to:
 Fjarðaál sf
 Bechtel International Inc. (Icelandic branch) as Agent
 Somastadir
 730 Reyðarfjörður,
 Iceland

Attention: Accounts Payable
 Reference: Contract No. 24956-000-FC4-EWU2-00001

This contract embodies the entire agreement between OWNER and CONTRACTOR and supersedes all other writings. The parties shall not be bound by or be liable for any statement, representation, promise, inducement or understanding not set forth herein.

OWNER:

Fjarðarálf

By: Bechtel International Inc. (Icelandic Branch).
Agent

Authorized
Signature:

Print Name: David Busch

Print Title: Contracts Manager

CONTRACTOR:

SILEC CABLE

Authorized
Signature:

Print Name: Hamid Hakimi-Tabrizi

Print Title: Import Manager

Bechtel International, Inc. (Iceland Branch)

Fjarðaál Smelter Project

SERVICE ORDER

EXHIBIT A - GENERAL CONDITIONS

1. **INDEPENDENT CONTRACTOR:** CONTRACTOR is an independent contractor and all persons employed by CONTRACTOR in connection with this contract shall be its employees and not employees of BECHTEL or OWNER in any respect.

2. **AUTHORIZED REPRESENTATIVES AND NOTICES:** Unless otherwise specified, all notices and communications in accordance with or related to this contract shall be between authorized representatives designated in writing by CONTRACTOR and BECHTEL, in its capacity as Agent for OWNER. Notices shall be in writing and may be served either personally on the authorized representative of the receiving party, by facsimile, by courier or express delivery, or by certified mail to the facsimile number or address shown on the face of this contract or as directed by notice.

3. **LAWS, REGULATIONS, PERMITS AND TAXES:** All applicable laws, ordinances, statutes, rules, regulations, orders or decrees in effect at the time the Work under this contract is performed shall apply to CONTRACTOR and its employees and representatives.

Except as otherwise specified, CONTRACTOR shall procure and pay for all permits, licenses, certifications and other applicable governing authority requirements and inspections and shall furnish any documentation, bonds, security or deposits required to permit performance of the Work.

Except as otherwise specified, CONTRACTOR shall pay all taxes, levies, duties and assessments of every nature due in connection with the Work and shall make any and all payroll deductions and withholdings required by law.

4. **LABOR, PERSONNEL AND WORK RULES:** CONTRACTOR shall employ only competent and skilled personnel to perform the Work and shall remove from the Jobsite any CONTRACTOR personnel determined to be unfit or to be acting in violation of any provision of this contract. CONTRACTOR is responsible for maintaining labor relations in such manner that there is harmony among workers and shall comply with and enforce Project and Jobsite procedures, regulations, work rules, and work hours established by BECHTEL and OWNER.

OWNER may at its sole discretion, directly or through BECHTEL as its Agent, deny access to the Jobsite to any individual by written notice to CONTRACTOR. In the event an employee is excluded from the Jobsite, CONTRACTOR shall promptly replace such individual with another who is fully competent and skilled to perform the Work.

CONTRACTOR shall, to the extent permissible under applicable law, comply with the provisions of all labor agreement(s) which apply to the Work performed under this contract. If required by the terms of any such labor agreement(s), CONTRACTOR shall, immediately after contract award, agree to comply with and be bound by the terms of such labor agreement(s).

5. **SAFETY, HEALTH AND SECURITY:** CONTRACTOR shall at all times conduct all operations under this contract in a manner to avoid the risk of endangerment to health, bodily harm to persons and damage to property. CONTRACTOR shall comply with BECHTEL'S and/or OWNER'S Project Safety and Health Plan. CONTRACTOR shall, in accordance with CONTRACTOR'S established practices, have sole responsibility for implementing its safety and health program, taking all safety and health precautions necessary and continuously inspecting all equipment, materials and work to discover, determine and correct any conditions which might result in any of the aforementioned risks. CONTRACTOR shall furnish all safety equipment and instructions required for the Work and shall maintain and furnish accident, injury and all other records required by applicable laws and regulations or by BECHTEL.

CONTRACTOR shall comply with BECHTEL'S and OWNER'S Jobsite security requirements and at all times conduct operations under this contract in a manner to avoid the risk of loss, theft, or damage by vandalism, sabotage or any other means to any equipment, material, work or other property.

6. **ENVIRONMENTAL REQUIREMENTS:** Throughout performance of the Work, CONTRACTOR shall conduct all operations in such a way as to minimize impact upon the natural environment and prevent any spread of contaminated or hazardous materials.

In the event CONTRACTOR encounters on the Jobsite material reasonably believed to be a toxic or hazardous material, CONTRACTOR shall immediately stop work in the affected area and notify BECHTEL and OWNER of the condition. Pending receipt of written instructions from BECHTEL, CONTRACTOR shall not resume work in the affected area.

7. **CHANGES:** BECHTEL may, in its capacity as Agent for OWNER, at any time, without notice to the sureties if any, unilaterally direct in writing contract changes, including additions, deletions, rescheduling and acceleration or deceleration, to all or any part of the Work and CONTRACTOR agrees to perform such work as changed. If any change under this clause, whether or not changed by any such order, or act or omission of BECHTEL or OWNER, directly or indirectly causes an increase or decrease in the cost of or in the time required to perform any part of the Work an equitable adjustment shall be made to pricing or time of performance, or both. CONTRACTOR shall, within thirty (30) calendar days of such change or act or omission, notify BECHTEL and submit detailed information substantiating its impact. Upon agreement as to the impact of the change or act or omission, the contract shall be modified accordingly.

CONTRACTOR shall proceed diligently with performance of the Work, pending final resolution of any request for relief, dispute, claim, appeal, or action arising under the contract, and comply with any decision of BECHTEL or OWNER.

8. **WARRANTY:** CONTRACTOR warrants to BECHTEL and OWNER that equipment and materials furnished under this Contract shall be new, of clear title and of the most suitable grade of their respective kinds for their intended uses, unless otherwise specified. All workmanship shall be first class and performed in accordance with sound construction practices acceptable to BECHTEL. All equipment, materials and workmanship shall also conform to the requirements of this Contract.

CONTRACTOR warrants all equipment and material it furnishes and all work it performs against defects in design, equipment, materials or workmanship for a period from Work commencement to a date twelve (12) months after completion and acceptance of the Fjordaal project as a whole. If at any time during the warranty period, BECHTEL, OWNER, or CONTRACTOR discover any defect in the design, equipment, materials, or workmanship immediate written notice shall be given to the other parties. CONTRACTOR shall within a reasonable time propose corrective actions to cure such defects to meet the requirements of this Contract.

BECHTEL, at its sole discretion, may direct CONTRACTOR in writing and CONTRACTOR agrees to:

1. Rework, repair, or remove and replace defective equipment and materials or reperform defective workmanship to acceptable quality at a time and in a manner acceptable to BECHTEL;
2. Cooperate with others assigned by BECHTEL to correct such defects and pay to BECHTEL all actual costs reasonably incurred by BECHTEL in performing or in having performed corrective actions; or
3. Propose and negotiate in good faith an equitable reduction in the Contract price in lieu of corrective action.

All costs incidental to corrective actions including demolition for access, removal, disassembly, transportation, reinstallation, reconstruction, retesting and reinspection as may be necessary to correct the defect and to demonstrate that the previously defective work conforms to the requirements of this Contract shall be borne by CONTRACTOR.

CONTRACTOR further warrants any and all corrective actions it performs against defects in design, equipment, materials and workmanship for a period of twelve (12) months, in addition to any existing warranty period, following acceptance by BECHTEL of the corrected work.

9. **INDEMNITY:** CONTRACTOR hereby releases and shall indemnify, defend and hold harmless BECHTEL, OWNER and their subsidiaries and affiliates and the officers, agents, employees, successors and assigns, and authorized representatives of all the foregoing from and against any and all suits, actions, legal or administrative proceedings, claims, demands, damages, liabilities, interest, attorney's fees, costs, expenses, and losses of whatsoever kind or nature in connection with or incidental to the performance of this contract, whether arising before or after completion of the Work hereunder and in any manner directly or indirectly caused, occasioned, or contributed to in whole or in part, or claimed to be caused, occasioned or contributed to in whole or in part, by reason of any act, omission, fault or negligence whether active or passive of CONTRACTOR, its lower-tier suppliers, subcontractors or of anyone acting under its direction or control or on its behalf.

The foregoing shall include, but is not limited to, indemnity for:

- a. Property damage and injury to or death of any person, including employees of BECHTEL, OWNER or CONTRACTOR.
- b. The breach by CONTRACTOR of any representation, warranty, covenant, or performance obligation of this contract.

CONTRACTOR'S aforesaid release, indemnity and hold harmless obligations, or portions or applications thereof, shall apply even in the event of the fault or negligence, whether active or passive, or strict liability of the parties released, indemnified or held harmless to fullest extent permitted by law, but in no event shall they apply to liability caused by the sole negligence or willful misconduct of the party released, indemnified or held harmless.

10. **ASSIGNMENT AND SUBCONTRACTS:** Any subletting or assignment by CONTRACTOR of this contract or of any rights hereunder in any manner, in whole or in part, whether by operation of law or otherwise, without the prior written consent

of BECHTEL shall be void. Purchase orders and contracts of any tier must impose upon lower-tier suppliers and subcontractors all of the duties and obligations required to fulfill this contract. CONTRACTOR shall not subcontract with any party for the performance of all or any portion of the Work without advance approval of BECHTEL.

11. **SUSPENSION:** BECHTEL may, in its capacity as Agent for OWNER, by written notice to CONTRACTOR suspend the Work under this contract in whole or in part at any time. Upon receipt of such notice, CONTRACTOR shall discontinue work to the extent specified in the notice; continue to protect and maintain the Work; and take any other steps to minimize costs associated with such suspension.

Upon receipt of notice to resume suspended work, CONTRACTOR shall immediately resume performance under this contract to the extent required in the notice.

12. **TERMINATION:** OWNER may by written notice to CONTRACTOR terminate this contract in whole or in part at any time, either for OWNER'S convenience or for the default of CONTRACTOR. Upon such termination, all data, plans, specifications, reports, estimates, summaries, lower-tier purchase orders and subcontracts, completed work and work in progress, and such other information and materials as may have been accumulated by CONTRACTOR in performing this contract shall become the property of and be delivered to OWNER. If the termination is for the convenience of OWNER an adjustment in the compensation to be paid CONTRACTOR under this contract will be made, but no amount shall be allowed for anticipated profit on unperformed work. If the termination is attributable to CONTRACTOR'S default, CONTRACTOR and its sureties, if any, shall be liable for all costs incurred in completion of the terminated work which are in excess of the Contract Price.

15. **FINAL INSPECTION AND ACCEPTANCE:** When CONTRACTOR considers the Work under this contract complete and ready for acceptance, CONTRACTOR shall notify BECHTEL in writing. BECHTEL and OWNER will conduct such reviews, inspections and tests as needed to satisfy BECHTEL and OWNER that the Work conforms to contract requirements. BECHTEL will notify CONTRACTOR of any nonconformance and CONTRACTOR shall take corrective action and the acceptance procedure shall be repeated as required by BECHTEL until the Work is accepted. OWNER'S written Notice of Final Acceptance of the Work shall be conclusive except for latent defects, fraud, or OWNER'S rights under the General Condition titled "WARRANTY."

16. **INSURANCE:** CONTRACTOR shall, at its sole expense, maintain in effect at all times during performance of the Work insurance coverages with limits not less than those set forth below and with insurers and under forms of policies satisfactory to BECHTEL:

- a. Workers' Compensation and Employer's Liability as required by any applicable law or regulation.
- b. Commercial General Liability with limits of liability for bodily injury, property damage, and personal injury of not less than in United States Dollars:
\$1,000,000 Combined single limit for Bodily Injury and Property Damage each Occurrence;
\$1,000,000 Personal Injury limit each occurrence;
- c. Automobile Liability (Owned, hired and non-owned) with combined single limits of liability for bodily injury or property damage of not less than:
\$2,000,000 Any One Occurrence.
- d. In the event CONTRACTOR maintains insurance covering loss or damage to equipment, tools, or any other property of CONTRACTOR such insurance shall include an Insurer's waiver of subrogation in favor of BECHTEL and OWNER and their subsidiaries and affiliates.

The required limits may be satisfied by a combination of a primary policy and an excess or umbrella policy. The Commercial General Liability Insurance shall be the Occurrence Coverage Form.

Coverage b shall apply to the indemnity agreement in the General Condition titled "INDEMNITY" and shall include BECHTEL and OWNER, their subsidiaries and affiliates, and the officers, directors, and employees of the foregoing each as Additional Insureds, but only with respect to liability arising out of the operations for BECHTEL and OWNER by or for the CONTRACTOR. Such insurance shall be primary as regards any other coverage maintained for or by the Additional Insureds and shall contain a cross liability or severability of interest clause and also an Insurer's waiver of subrogation in favor of the Additional Insureds.

Neither BECHTEL nor OWNER is maintaining any insurance on behalf of CONTRACTOR covering loss or damage to the Work or to any other property of CONTRACTOR unless otherwise specifically set forth herein.

None of the requirements contained herein as to type, limits, and approval of insurance coverage to be maintained by CONTRACTOR are intended to and shall not in any manner limit or qualify the liabilities and obligations assumed by CONTRACTOR under this contract.

CONTRACTOR shall deliver to BECHTEL no later than ten (10) calendar days after contract award, but in any event prior to commencing the Work or entering the Jobsite, Certificates of Insurance evidencing such coverage and limits of insurance are in full force and effect. Certificates shall be issued in a form acceptable to BECHTEL and provide that the

less than thirty (30) days advance written notice will be given to BECHTEL prior to cancellation, termination or material alteration of such policies. Delivery of the original and two (2) copies of the certificates and any notices of policy change shall be made to:


Bechtel International Inc. (Icelandic branch) as Agent
Somastadir
730 Reydarfjordur,
Iceland

Attention: Contracts Manager
Reference: Contract No. 24956-000-FC4-EWU2-00001

17. **CONTRACT SCHEDULE:** CONTRACTOR may, from time to time, be required to provide to BECHTEL for approval an original and subsequently updated Contract Schedule showing all activities and sequence of operations needed for the orderly performance and completion of the Work. CONTRACTOR shall adhere to the approved Contract Schedule, submitting periodic progress reports and proposed schedule changes in form and manner directed by BECHTEL.
18. **RELEASE AGAINST LIENS OR CLAIMS:** CONTRACTOR shall promptly pay all claims of persons or firms furnishing labor, equipment or materials used in performing the Work hereunder. OWNER may, as a condition precedent to any payment hereunder, require CONTRACTOR to submit satisfactory evidence of payment and releases of all such claims. If there is any evidence of any such unpaid claim, OWNER may withhold any payment until CONTRACTOR has furnished such evidence of payment and release and shall indemnify and defend BECHTEL and OWNER against any liability or loss arising from any such claim.

APPENDICES

A-1 CONTRACTOR ENVIRONMENTAL REQUIREMENTS
A-2 SAFETY AND HEALTH STANDARDS
A-3 Not used
A-4 SCHEDULE OF CONTRACTOR'S PRACTICES
A-5 ACCOMMODATION CODE OF CONDUCT



Fjardaal Smelter Project

APPENDIX A-1

Environmental Requirements

NO.	DATE	REVISIONS	BY	CHK'D	PE
A	8/22/03	For Review	DJD		

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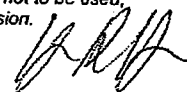


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1 Introduction

This document provides a general description of necessary environmental requirements to be met by the installation subcontractors. This document is intended to be a guiding document only, and does not supersede requirements stipulated by regulatory or permit conditions.

All subcontractors and their sub-tier contractors are expected to practice a pro-active approach to environmental compliance which emphasizes the avoidance and prevention of environmental incidents and the absence or minimal generation of by-products.

2 Regulatory Compliance

The Subcontractor shall be familiar with all regulations, laws and requirements which apply or control the work and activities to be performed by the Subcontractor. Subcontractor shall obtain all necessary national, regional and local permits and/or approvals required to perform their work, including necessary equipment transport permits, health permits for use and installation of sanitary facilities, potable water, food vending or other regulated activities.

3 Site Access

All equipment and personnel shall enter the site(s) only at approved locations.

4 Hazardous Materials

Subcontractor shall develop a materials management plan to control the use of and final disposition of all chemicals, solutions, compounds and materials used for their work.

4.1 Chemicals and Compounds

- Subcontractor shall notify Contractor in writing of the name and quantity of all chemicals, solutions, compounds and materials to be brought on site. Final approval of chemicals will be by Owner.
- Material Safety Data Sheets (MSDS) must be maintained on site for all materials used by Subcontractor. Copies of MSDS shall be provided to Contractor or Owner upon request.
- Subcontractors shall maintain an inventory of all hazardous materials which are used on site.
- Containers must be compatible with the materials to be contained within.
- All containers must be properly labelled to identify the name of the material and precautions (if applicable) associated with the material.
- Materials shall only be used in accordance with manufacturer's directions and recommendations.
- Utilize only properly trained individuals to handle the hazardous materials;
- Have adequate spill response supplies to reasonably manage or control a spill.

4.2 Hazardous Materials Storage

No storage of hazardous materials on site(s) is allowed.

4.3 Vehicle Fuelling

- Subcontractor shall have written procedures for fuelling practices which include precautions for overfilling and spill response.
- Refuelling shall only be performed in an approved area or location. No refuelling shall be done within 50 meters of streams, ponds, or ocean.
- Personnel shall be appropriately trained to perform refuelling operations. Personnel shall be trained to respond to safety and environmental emergencies encountered during refuelling operations.
- Fuel must be transported and dispensed in/from appropriate containers designed for the transport of motor fuels.
- Subcontractor shall obtain all necessary licenses and permits to transport and dispense fuels, or utilize the services of a licensed refuelling operator.
- Catch pans, drip pans or secondary containment shall be used during refuelling operations.
- Fuel shall not be stored on site(s).
- Spill response materials shall be readily available.
- Fire extinguishers shall be readily available.

4.4 Vehicle Maintenance

- Regular and routine maintenance of vehicles and equipment shall not be performed on site.
- Emergency, non-routine maintenance or maintenance on large equipment which cannot practically be removed from the site is allowed only in a designated area.
- Maintenance activities shall be performed over impermeable surfaces in approved areas only. Drip pans, plastic sheeting or other suitable means of containment for liquids shall be used during maintenance.
- All maintenance personnel shall understand and follow spill prevention measures.
- Materials saturated with petroleum products shall be drained and/or stored in appropriate containers and disposed of only at a licensed treatment/recycling facility in accordance with national, regional and local legislation.
- Used oil and petroleum products must be recycled at a licensed recycling/collection facility. Subcontractor must obtain and retain all documentation of transport, lading and delivery of all used oil, hydraulic oil, antifreeze (glycol) and hazardous by-products to the respective treatment/recycle facility.

4.5 Spill Prevention and Response

4.5.1 Spill Kits

All construction equipment (e.g., dump trucks, dozers, excavators, pumps, generators) shall have spill kits that, at a minimum, supply sufficient absorbent material to contain and clean up potential drips, leaks, or spills (e.g., ruptured hydraulic line) and a heavy plastic bag to contain clean-up materials and contaminated soils or by-products. Bags containing used cleanup material will be transported to the designated hazardous material/by-product storage area for proper containerization, labelling, and classification prior to treatment/recycling.

4.5.2 Stationary Equipment

Drip pans, plastic sheeting, or other appropriate containment shall be placed under all stationary equipment (e.g. electric generators, compressors, pumps) or construction equipment which is to be in one location for more than 48 hours (e.g. drilling rigs, cranes) to catch leaks and drips of fuel, fluids and lubricants associated with the operation of the equipment.

4.5.3 Equipment Inspection

All stationary and mobile equipment shall be inspected visually on a daily basis, or prior to immediate operation, for leaks, drips, or other conditions which pose a safety or environmental hazard. Subcontractor is required to repair or replace leaking equipment, or immediately utilize containment to prevent hazardous materials from entering the environment. Subcontractor is responsible for clean-up of spills and contaminated areas in accordance with national, regional and local regulations and Contractor requirements.

4.5.4 Spill Response

- Subcontractor shall have a written Spill Response Plan which addresses the response action, personnel responsibilities, reporting duties, and post-event investigation which will be undertaken in the event of a spill.
- Subcontractor cannot commence work until this plan has been approved by Contractor.
- All spill response and reporting must comply with applicable national, regional and local legislations and jurisdictions and Contractor requirements.
- All Subcontractor personnel shall undergo sufficient training in spill response to enable them to appropriately and effectively perform their duties in the event of a spill.

5 By-product Management

5.1 By-product Minimization

The Project maintains a policy of "Total Care and Control of Construction Byproducts". The subcontractor shall minimize generation of by-products. To the maximum extent practicable, by

products shall be reused or recycled. Materials and processes shall be selected which generate the least by-product and allow recycle/reuse of the by-product.

- Subcontractor is required to develop a by-product management plan which addresses the handling, storage, management, treatment and recycling of by-products generated in the performance of their work. Contractor must approve the plan prior to commencement of work.
- Subcontractor must follow all applicable national, regional and local legislation and jurisdictions regarding the effective and safe disposal of all by-product materials.
- Subcontractor shall provide the necessary containers for the collection, segregation and storage of by-products for recycle or reuse.
- Project by-product shall be disposed of only at authorized facilities licensed to receive, recycle, treat or dispose of by-products. Subcontractor shall obtain and retain all documentation, chain of custody, bills of lading and other documentation that by-product has been appropriately transported and disposed of.
- By-products shall be placed in receptacles and containers specifically suited or designed for by-product collection.
- All by-product receptacles shall be appropriately labelled.
- Subcontractor shall maintain a By-product Log which provides an inventory of all by-products generated, treated or recycled.

5.2 Solid By-products

Solid by-products include food by-products, garbage, trash, general refuse, paper, plastic and other, non-hazardous by-products. Solid by-products shall be sorted for recycle where applicable, or transported to a facility where they can be sorted for recycle (Thermunes).

The burning of by-products onsite is prohibited. For safety reasons, no open burning is allowed. All open burning and fires must be authorized by Contractor.

5.3 Hazardous By-products

Hazardous by-products are by-products which pose a particular hazard to persons or to the environment. By-products which have hazardous characteristics such as flammability, or toxicity, or contain known toxic compounds such as mercury, PCBs, asbestos, pathogenic organisms or other hazardous materials shall be managed in accordance with all national, regional and local regulations. Subcontractor shall notify the Contractor in advance of the estimated type and quantity of hazardous by-products which will be generated by Subcontractor work activities.

Hazardous by-products shall only be transported, treated and recycled by licensed operators. Subcontractor shall maintain all necessary documentation and certificates of disposal for hazardous by-products generated by their work. Subcontractor is responsible for completing all necessary reports to governmental agencies regarding the generation, storage, transportation and disposal of hazardous by-products.

5.4 Sanitary By-product

If portable toilets are used on the site, sanitary by-products (i.e., sewage) shall be collected and transported by a licensed sanitary operator, and processed by a licensed municipal wastewater facility.

6 Stormwater Management

Subcontractor shall develop necessary plans and actions to protect the quality of stormwater effluent from the site.

6.1 Erosion and Sedimentation Control

Subcontractor shall install erosion and sedimentation control measures to prevent silt and sediment from entering stormwater effluent. Erosion and sediment controls shall be selected and sized based on the expected storm runoff, sediment load, and anticipated activities. Controls shall be implemented when earth moving activities commence, and remain in place, and functional, until the area is stabilized, or permanent control measures are installed.

Silt fencing, straw bales, rock berms, sediment ponds or traps, vegetative barriers, dikes, berms, swales, ditches or other recognized means of control are acceptable. All sediment controls shall be

inspected, maintained and cleaned by the Subcontractor to assure proper performance of the control device/installation.

6.2 Discharge Quality

All stormwater discharge shall meet legislated standards for total suspended solids, and for oil or chemical contaminants. Cement, concrete and masonry grouts are considered potential contaminants to storm water. Subcontractor shall take necessary action to prevent these contaminants from entering stormwater run-off.

6.3 Monitoring

Subcontractor shall monitor, sample and test all water discharges if required by governmental regulation or permit.

6.4 Other Wastewaters

Discharges of non-storm wastewaters will be evaluated and approved on a case-by-case basis. Evaluation criteria for discharge include the quantity and quality of the expected discharge, impacts to the environment, fiscal and temporal impacts to the project, legal and regulatory implications. No discharge of wastewater from the site is allowed without prior authorization from the Contractor.

7 Stream Crossings

If applicable, Subcontractor shall construct the necessary temporary structures such as culverts or bridges to allow equipment to cross streams and water bodies on site. Subcontractor shall take all necessary precautions to prevent contamination, deterioration or degradation of streams and the water quality of the streams.

8 Site Redress

When work is completed, Subcontractor shall restore the site to a condition which is benign to the environment. All excavations, holes, pits or depressions created by Subcontractor shall be filled to prevent injury to persons or animals. All equipment and by-products shall be removed from the site.

9 Noise

Subcontractor shall minimize noise generation where practicable. Subcontractor shall provide necessary personnel protective equipment, engineered control or administrative controls to protect workers and public from excessive noise.

9.1 Equipment

All equipment shall have operable mufflers or sound attenuation per original manufacturer's specifications.

9.2 Notice

Subcontractor shall notify Contractor and local jurisdictions, and the affected public of all noise generating activities which will affect the public. Typical activities would be the use of explosives, pile hammering, impact drilling or other excessively noisy activities.

10 Dust Control

A number of fugitive dust control measures may be employed if required:

- Use of water spray;
- Pave or gravel frequently travelled routes;

The use of chemical dust suppressants, soil treatments (e.g. lingo-sulphonates) or oil to suppress dust is prohibited unless approved by Contractor.

11 Mud Carryover

Subcontractor shall assure that the wheels of all vehicles exiting the site are clean of mud and accumulated soils from the site. Subcontractor must immediately respond to, and address any complaints of dust or dirty road conditions from the public. Subcontractor shall clean public roads of dirt and mud as required.

12 Unanticipated Discovery

During normal construction activities, there exists the potential for encountering archaeological sites, or areas of historical contamination that were not previously identified.

When an unanticipated discovery is made, the Subcontractor is required to immediately stop work in the area and notify the Contractor who will in turn notify the Owner of the discovery. Work cannot resume in the area without written notification from the Contractor.

Subcontractor shall not further disturb, handle, obtain or remove any artifacts which may be discovered. Subcontractor shall barricade, or otherwise mark the area and secure the area to prevent further disturbance. The Contractor and Owner shall obtain the proper authorizations, and expertise required to further investigate and catalogue the discovery.

13 Sensitive Resource Protection

The Subcontractor shall not harass, hunt, or otherwise take any wildlife which may be found on the site or along the immediate coast. If animals or nests are in the immediate work area, and impede the progress of the work, the Subcontractor shall immediately notify the Contractor. Contractor and Owner in conjunction with Game Wardens or other appropriate governmental agencies, will determine the course of action to remove or otherwise displace the impeding animals.

14 General Orientation

As a minimum, all personnel shall receive an orientation explaining the aspects of this *Environmental Requirements* document.

14.1 Job-Specific Training

Job-specific training may be required for those personnel involved with the following activities:

- Equipment maintenance and repair;
- Refuelling, fuel handling, and spill response;
- Installing/maintaining erosion and sediment controls;
- Earthworks (e.g., clearing, grading, trenching); and
- By-product (waste) management.

Subcontractor shall provide the necessary training, as required.

15 Inspection, Monitoring and Audits

15.1 Subcontractor

Subcontractor shall conduct routine daily visual inspections of all by-product collection areas and containers to look for signs of deterioration, leaks, unsecured container lids, or excess accumulation of materials in the containment areas. All visible leaks and releases shall be promptly corrected.

Equipment operators shall conduct routine inspections (i.e., at the start of the work day) on equipment to check for leaks, perform periodic preventive maintenance on equipment to minimize the potential for spills or leaks, and ensure spill kits are complete and available.


Subcontractor shall inspect all areas of excavation, drilling and other disturbance to assure that erosion and sedimentation controls are in place and are effective. Subcontractor shall verify the final status of all borings and excavations for appropriate closure.

All inspections shall be documented, with corrective action(s) taken as soon as practical.

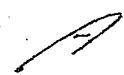
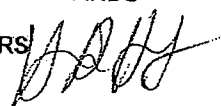
15.2 Contractor

Contractor will include environmental compliance as part of the weekly subcontractor Environmental, Safety and Health (ES&H) evaluation process.

Contractor in conjunction with the Owner may perform periodic audits of Subcontractor to assure compliance with the conditions set forth in this and other applicable scope and contract documents.

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APPENDIX A-2
SAFETY and HEALTH STANDARDS
FOR
CONTRACTORS




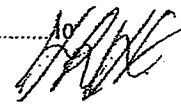
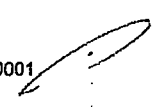

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Appendix A-2

SAFETY AND HEALTH (S&H) STANDARDS
For CONTRACTORS

SECTION I – 100 SERIES

1. S&H POLICY – ZERO ACCIDENT PHILOSOPHY

1.1 Contractor shall have a written S&H Policy which demonstrates an understanding that S&H concepts must be closely integrated into the total business process and are an integral part of the business strategy just as cost, schedule and quality are. The S&H Policy must be formally communicated to, and fully understood by all levels of the Contractor organization.

1.2 Contractor's S&H Policy shall:

- State that adequate resources will be provided to apply the best-known principles and techniques of loss prevention and performance measurement.
- Require that Contractor's Site Managers and all supervisors clearly communicate Contractor's S&H expectations at all Project meetings and by way of their actions demonstrate a personal commitment to follow the S&H Policy at all times.

1.3 Bechtel has adopted a "Zero Accident" philosophy that all work related accidents, incidents, injuries and illnesses are preventable, and which promotes:

- The immediate identification and elimination of unsafe work practices and conditions in the work place.
- A heightened awareness of individual responsibility and increased supervisory attention to detail.
- Elimination of human error as a source of accidents, irrespective of rank or position in the organization.
- Building a team safety mentality where each worker contributes to the effort and each supervisor is fully aware of the capabilities and limitations of their team.
- A culture in which everyone accepts responsibility and accountability for their own and each co-worker's safety and health.

1.4 Contractor shall adopt the Bechtel "Zero Accident" philosophy in performance of the Work under this subcontract, ensuring it is communicated to and fully understood by all levels of Contractor's organization. In its promotion of this philosophy, Contractor shall incorporate into its S&H Plan, methods and strategies to eliminate work related accidents, incidents, injuries and illnesses.


2. RESPONSIBILITIES

2.1 Contractor shall submit to Bechtel a written S&H Plan, specific to the Work under this subcontract, for review and acceptance within thirty (30) calendar days after subcontract award and in any event prior to commencing work at the Jobsite. This plan shall be amended when operations or conditions require and such amendments shall be submitted to Bechtel for review and acceptance.


- Where this Appendix requires a written plan (i.e. Hazard Communication Plan, see section 15.1, etc.), Contractor may satisfy this requirement with an appropriate section in Contractor's S&H Plan.

Contractor shall flow all Project S&H requirements to lower tier suppliers, Contractors, and visitors and acknowledges it is responsible for the performance of its visitors and suppliers and Contractors of every tier.

2.2 Contractor's S&H Plan shall require that management/supervisory actions demonstrate that cost, schedule, and quality concerns do not prevail over S&H Project requirements.

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- 2.3 Contractor's S&H Plan shall delineate the roles and responsibilities of managers and supervisors and require that their actions clearly demonstrate an understanding of their roles and responsibilities in regard to the safety process. The plan shall describe the system by which managers and supervisors will be held accountable for S&H implementation.
- 2.4 Contractor's S&H Representative(s) and their staff shall have sufficient authority and control to ensure effectiveness of the S&H process and Contractor shall hold them accountable for facilitating its implementation.
- 2.5 Contractor's managers and supervisors shall be familiar with and enforce S&H rules, regulations, and laws and document all actions taken to ensure compliance with Contractor's S&H Plan.
- 2.6 Contractor's managers and supervisors shall take part in scheduled work area audits and implement and document required corrective actions.
- 2.7 Contractor's Site Manager shall support, promote, and participate in all safety and health activities defined by Bechtel
- 2.8 Contractor's Site Management shall attend and clearly communicate Contractor's S&H expectations at all employees.
- 2.9 *If applicable to your scope of work*, Contractor Site Management, managers, and supervisors shall participate in S&H assessments to be determined by Bechtel. Contractors may be required to conduct and document their own self-assessments.
- 2.10 Contractor's managers and supervisors shall provide documented, positive reinforcement and recognition for safe behavior.
- 2.11 Contractor's managers and supervisors shall attend, actively participate in, and consistently demonstrate strong leadership at weekly Toolbox Safety Meetings.
- 2.12 Contractor's managers and supervisors shall actively participate in documented pre-job planning activities. Specifically, Job Hazard Analysis' (JHA) and employee pre-task planning sessions known as Safe Task And Risk Reduction Talks (STARTR).
- JHA is used to identify, analyze, understand and mitigate potential hazards associated with repetitive or potentially hazardous work operations.
 - STARTR is a pre-task planning tool to be used by all supervisors, which allows the employees of a work group to review a task before starting work.
- 2.13 Contractor shall inform all its Project personnel of potential hazardous conditions and/or near miss incidents and shall document such communications.
- 2.14 Before beginning any work, Contractor shall require all lower tier suppliers and Contractors to submit a written S&H Plan specific to their scope of work. Contractor shall review and accept all such plans for compliance with Bechtel, Owner, and regulatory requirements.
- 2.15 Bechtel may require depending on size of contract or scope of work, Contractor to employ S&H Representative(s) acceptable to Bechtel, submitting resumes and credentials for Bechtel review, verification, and acceptance. S&H Representative(s) shall be resident on the Project for all Contractor work activities.
- 2.16 Contractor shall participate in work area audits and root cause investigations.
- 2.17 Contractor shall have current copies of applicable codes and standards readily available.
- 2.18 Contractor shall conform to the Project Drug and Alcohol Program and/or requirements if applicable.
- 2.19 Contractor shall attend and participate in weekly Toolbox Safety meetings.

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2.20 Contractor shall know and comply with the Project Construction Environmental Control Plan (CECP).

2.21 Contractor shall stop work if unknown or unanticipated hazards or work conditions evolve which place employees at risk or necessitate greater precautions than currently exist or are required in the Project S&H Plan. Contractor shall immediately report all such incidents to Bechtel.

3. ORIENTATION AND TRAINING

3.1 Contractor Management shall provide the support and resources necessary to ensure adequate and effective training is provided and documented. Supervisors shall ensure adequate time is provided for such training.

3.2 Before Contractor employees are placed on any worksite, training shall be provided which satisfies Project training requirements. A verification process (i.e. comprehension testing) shall be implemented to evaluate and ensure employee knowledge and understanding of all training provided.

3.3 Contractor shall update training materials to reflect changes in applicable laws, regulations or Project requirements.

3.4 Contractor shall provide and require employees to attend specialized training applicable to their work (e.g. confined space, benzene, fire watch, etc).

3.5 Contractor shall ensure qualified Contractor or vendor instructors present all specialized training and such training is conducted in a manner that provides sufficient space, time, and materials.

3.6 All Contractor employees shall attend their company specific New Employee Orientation. Bechtel may require Contractor employees to attend Bechtel's New Employee Orientation. This is dependent on the phase of the project and readiness to conduct such activities. All orientation shall include the thorough coverage of Bechtel's and Contractor's S&H requirements. Documentation of all training and comprehension testing shall be kept on file and made available to Bechtel.

3.7 Contractor shall have a tracking system in place to ensure all employees attend the New Employee Orientations.

3.8 Contractor's managers and supervisors shall be educated on Contractor's S&H Plan and Management System.

3.9 Contractor shall ensure that anyone working on the Project for more than 3 days is required to attend New Employee Orientation.

3.10 Contractor shall ensure that all Project visitors/vendors are escorted at all times by an authorized and responsible Contractor employee who is knowledgeable of all S&H practices and procedures and instructs and supervises the visitor/vendor accordingly.

4. MEDICAL SERVICES & MEDICAL TREATMENT


4.1 Contractor site personnel who provide medical treatment shall be properly trained and qualified with a copy of their current certifications maintained on site.

4.2 Contractor shall ensure its employees understand and comply with its medical management procedures.

4.3 Contractor emergency equipment shall be inspected daily to ensure effective operation. All such inspections shall be documented kept on file, and made available to Bechtel.

4.4 Contractor shall maintain clean and orderly first-aid facilities (where applicable).

4.7 Contractor shall ensure injured employees are referred to qualified industrial/occupational medical providers if offsite treatment is needed. The injured employee's employer shall provide transportation for such offsite medical treatment.

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4.8 Contractor employees injured on the Project and returned for modified duty shall have this status documented by the treating medical practitioner and reported to the Bechtel.

5. MEDICAL REPORTING AND RECORDS

5.1 Contractor medical records shall be maintained up-to-date. A weekly and monthly Injury/Illness and Hours Worked report shall be submitted to the Bechtel on a form supplied by Bechtel.

5.2 All matters pertaining to medical records and reports shall be kept strictly confidential. Contractor shall maintain and file their employee's workers' compensation or insurance claims forms as/if applicable.

6. SAFE TASK / JOB ANALYSIS

6.1 Contractor shall use Bechtel's Job Hazard Analysis system (JHA) and its employee pre-task planning process known as Safety Task And Risk Reduction Talks (STARTR). If preferred, Contractor may use its own equivalent systems, subject to Bechtel review and acceptance.

6.2 The JHA shall be used to describe work steps and to identify, analyze, understand and mitigate potential hazards associated with repetitive or potentially hazardous work operations engaged in over a period of time. The JHA format will be provided by Bechtel and completed by Contractor.

The supervisor shall use the STARTR process, with participation from the entire crew, to identify potential hazards associated with a particular task, just prior to its commencement. The STARTR process shall be used at the beginning of every shift and prior to starting any new task in the course of a shift. The process takes approximately fifteen (15) minutes each morning or before beginning any new work task during the course of a shift.

6.3 Supervisors shall ensure that their employees understand the purpose of, and participate in the JHA and STARTR processes and shall use them as primary planning and lessons learned tools.

7. REPORTING / INVESTIGATING INCIDENTS & ACCIDENTS

7.1. Contractor shall promptly report all such occurrences to Bechtel and unless directed otherwise, will take the lead in the investigation, documentation and initiation of corrective action. Contractor shall keep records of all incident/accident investigations in a format acceptable to Bechtel and shall provide Bechtel with a copy within 24 hours of the occurrence.

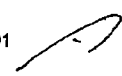
7.2 Contractor shall develop a written Notification and Investigation Procedure acceptable to Bechtel. Contractor's S&H Representative shall oversee the investigation of all incident and accident cases and reports. Information derived from such reports shall be issued as lessons learned to all employees on the Project.


8. GOVERNMENT AGENCY INSPECTIONS

9.1 Contractor shall ensure its personnel are aware of and comply with the procedures to be taken in the event of a government inspection of any type.

9.2 Contractor shall immediately notify the Bechtel representative when a government inspector of any type requests entry onto the Jobsite or they are contacted by a government agency.

9.3 Following any government inspection, Contractor shall submit a written report to Bechtel, which details all aspects of the inspection.

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SECTION II - 200 SERIES

9. TOOLS & EQUIPMENT

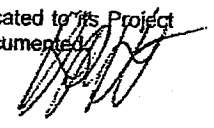
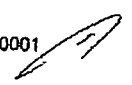
- 10.1 Contractor shall provide and ensure that all tools are used in accordance with the manufacturers' recommendations, have required guards in place, and are maintained in good working order.
- 10.2 Contractor will not use job-made tools of any kind on the Project (e.g. tools made of rebar, rigging equipment, etc.). All tools and equipment shall be used and maintained in accordance with manufacturer recommendations. If exceptions to this rule are needed (i.e. spreader beams), they must be brought to Bechtel's attention for review and acceptance prior to use.
- 10.3 Contractor shall ensure that work is performed only in areas and at times where adequate illumination exists. Contractor shall provide all lighting required to safely perform work. Artificial lighting equipment shall be manufactured to a recognized international standard acceptable to Bechtel.


10. HAZARD COMMUNICATION

- 11.1 Contractor shall develop a written Hazard Communication Plan, which complies with the applicable country standard. If no country standard exists US or UK and Bechtel standards shall be compiled with. The Plan shall describe the method it will use to communicate the hazards associated with chemical handling, use, storage and disposal. The plan shall be submitted and acceptable to Bechtel prior to beginning work and shall comply with the Project Construction Environmental Control Plan.
- 11.2 Contractor shall seek approval from Bechtel for chemicals to be brought onto any work site and make available to Bechtel Material Safety Data Sheets (MSDS) for each hazardous material purchased and/or carried onto a worksite. Materials that arrive without an MSDS shall be quarantined and not released until the MSDS is received on site and Bechtel approves the material for use. Contractor shall maintain a list of hazardous materials on site and the quantities of each.
- 11.3 Contractor shall ensure that employees are trained in the recognition, proper handling and use of hazardous substances. Contractor's New Employee Orientation shall include introductory training on the topic of hazardous substances; however, specific hazardous material training shall be provided by the Contractor for its Project employees whose work involves the use of any hazardous material under its control. Such training shall be properly documented, filed and made available to Bechtel.
- 11.4 Contractor shall properly label all hazardous substances and/or chemicals that have been transferred from the manufacturer's container into another container. Inspections shall be made and documented by the Contractor to ensure that adequate labeling occurs.

11. EMERGENCIES & EVACUATIONS

- 12.1 Contractor shall develop an Emergency Response Plan and, as required. The plan will address emergency evacuation, medical emergencies, natural disasters, etc. The plan shall be submitted and acceptable to Bechtel. The plan shall include emergency alarm systems, assembly and evacuation points, an employee head count process, and provisions for employee training before entering the Jobsite and any specific worksite as a part of Contractor's New Employee Orientation.
- 12.2 Contractor shall ensure that Emergency Response Plan requirements are clearly communicated to its Project personnel. Such communication and employee comprehension and participation shall be documented.

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12. BLOODBORNE PATHOGENS

13.1 Contractor employees who are exposed to bloodborne pathogens shall be properly trained regarding their responsibilities, required control measures, and personal safety. Proper personal protective equipment shall be used when exposure hazards exist. Each Contractor employee whose job duties puts them at risk of exposure (i.e. medic, nurse, first aid person, etc.) shall be offered vaccinations and documentation of the vaccination or declination shall be maintained and made available to Bechtel.

13.2 Contractor shall provide all its employees with a general overview on the hazards associated with bloodborne pathogens, possible means of exposure, and proper control methods.

13.3 Provisions shall be made for proper disposal of hazardous medical wastes (if any are generated).

13. PERSONAL PROTECTIVE EQUIPMENT

14.1 Contractor shall require employees to wear eye protection equipped with hard side shields (safety glasses) manufactured to a recognized international standard acceptable to Bechtel. This applies to prescription eyewear as well. Contractor shall monitor the eye protection worn by its employees and take immediate corrective actions when noncompliance is noted. Employees performing grinding and buffing operations shall wear face shields and safety glasses or mono goggles.

14.2 Contractor employees with field responsibilities shall wear Safety toed boots which meet the applicable standard for the region which the work is to be conducted in. If no local standard exists then US ANSI standards shall be used.

14.3 Contractor employees shall receive information regarding personal protective equipment requirements during Contractor's New Employee Orientation.

14.4 Contractor shall provide its employees with life jackets when working over or near open water and shall require their use. Contractor supplied life rings, rope and a rescue vessel acceptable to Bechtel shall be in place when a drowning threat exists.

14.5 Contractor employees who handle chemicals or harmful substances shall be trained and shall wear appropriate personal protective equipment per the chemical manufacturer's recommendations.

14.6 Hardhats manufactured to a recognized international standard and acceptable to Bechtel shall be worn with the brim forward at all times when in the field. Company and employee name shall be conspicuously displayed.

14.7 Contractor shall require all employees to wear long pants and a suitable shirt, with no less than 4" or 10 cm sleeves, as the minimum work clothing to be worn on the Project.

14.8 Contractor shall provide and require the use of hearing protection manufactured to a recognized international standard and acceptable to Bechtel, whenever a hearing hazard exists.


14. HEAT AND COLD STRESS PREVENTION

18.1 As/if required, Contractor shall have operating and emergency procedures for cold stress.

18.2 Contractor shall provide an immediately accessible, adequate, and sanitary potable water supply during all periods of the day.

15. HOUSEKEEPING, FIRE PREVENTION & PROTECTION

19.1 Unless specified elsewhere in the subcontract, Contractor shall provide clean, potable drinking water for its employees in a safe, hygienic manner at all worksites. Single use cups shall be provided in a sanitary dispenser. These cups shall be replenished as needed during the day and trashcans provided for their disposal. "Community" or common use cups shall not be used.

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19.2 Unless specified elsewhere in the subcontract, Contractor shall provide and maintain its own sanitary toilet facilities for its employees. The daily facilities cleaning, and maintenance, and method and location of waste disposal shall be to a high standard acceptable to Bechtel.

19.3 Prior to starting any work Contractor shall develop and submit to Bechtel for review and acceptance a Fire Protection and Prevention Plan specific to the Work under this subcontract.

19.4 Contractor shall provide all fire protection and prevention equipment necessary for its operations. Contractor shall train employees in the proper use of fire extinguishers.

19.5 Contractor shall develop specific written requirements for the handling, storage, and use of flammable and combustible liquids, and shall ensure they are stored properly, dispensed in safety cans manufactured to a recognized international standard acceptable to Bechtel, and areas designated for these activities are maintained in an orderly fashion. All hazardous areas shall be posted with appropriate signs and access shall be controlled.

16. FALL PREVENTION / PROTECTION

20.1 The Contractor S&H Plan shall include a written Fall Prevention/Protection Procedure acceptable to Bechtel, that makes maximum use of primary fall protection systems, such as scaffolds, aerial lifts, personnel hoists, etc.

20.2 Contractor shall require the inspection of fall protection equipment prior to each use.

20.3 Contractor shall adopt a 100% fall protection policy that makes provision for secondary fall protection (full-body harness) for all employees who are working or traveling more than 6 feet or 2 meters above ground. All fall protection devices shall be manufactured and used in accordance with a recognized international standard acceptable to Bechtel.

20.4 Contractor shall review its scope of work to identify the methods to achieve 100% fall protection prior to commencement of such work. Where lifeline systems are used, anchor points shall be capable of supporting at least 5,000 pounds or 2275 kg. If lifelines are used they shall be installed and maintained by qualified persons who are competent and possess the rigging knowledge necessary to ensure the integrity and safety factors necessary for lifeline system installation. Lanyards shall be secured to vertical lifelines by rope grabs only. Knots, painters-hitches, or loops are not acceptable. Horizontal lifelines shall have tie-off points at least waist high.

20.5 Contractors using retractable lifeline devices shall secure them by means acceptable to Bechtel and in all cases by a means capable of supporting at least 5000 pounds or 2275 kg.


20.6 Contractor shall require employees to wear an approved safety harness/lanyard system if they work from ladders where the fall exposure is less than 6 feet or 2 meters, and they are unable to maintain 3-point contact

17. BARRICADES

21.1 Contractor is responsible for properly erecting and maintaining barricades and barriers in such a manner that they provide adequate protection.

21.2 Barricades and barriers erected by Contractor shall have appropriate signs and tags indicating the nature of the hazard and the responsible supervisor. Barricades left after dark in close proximity to roadways shall be properly equipped with flashing amber lights.

21.3 Contractor shall provide and use appropriate barrier devices to identify the nature of the job hazard involved (i.e., yellow and black for "CAUTION" or red and black for "DANGER"). Barrier devices, including barrier tape, shall not be used as a substitute for a barricade as they do not offer adequate protection from falls. Barrier devices shall be used only in those applications where temporary identification of a hazard is needed; but not as a primary means of protecting employees from exposure.

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21.4 Contractor shall ensure that employees understand and comply with barricade and barrier procedures (i.e. prohibited entry into red barrier taped areas).

18. ELECTRICAL EQUIPMENT INSPECTION / ASSURED GROUNDING/ GFCI

26.1 Contractor shall provide Ground Fault Circuit Interrupters or an assured grounding program acceptable to Bechtel.

26.2 Contractor shall train employees regarding electrical inspection and electrical safety.

26.3 Contractor shall maintain records of all tool inspections and make these records available to Bechtel.

26.4 Contractor shall ensure all tools are checked for continuity after repairs are made.

19. VEHICLE OPERATIONS

27.1 Contractor shall ensure all vehicles are registered/licensed, maintained in a roadworthy condition, and operated in a safe manner in accordance with manufacturer recommendations.

27.2 Contractor shall ensure all persons operating vehicles are healthy and unimpaired, have appropriate and required operators licenses, and observe established road regulations and/or Jobsite regulations.

27.3 Contractor shall provide a seat belt for each vehicle passenger and enforce the wearing of seat belts any time a vehicle is in motion. Busses provided for Project transportation may be exempt from this requirement, if authorized by Bechtel in advance of their use.

SECTION III – SPECIAL REQUIREMENTS

20. GENERAL

This section describes those S&H requirements of an administrative and/or Project specific nature and those unique to this subcontract.

21. SAFETY AND HEALTH ORIENTATION

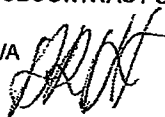
N/A

22. PROJECT SPECIAL REQUIREMENTS

N/A

23. SUBCONTRACT SPECIAL REQUIREMENTS

N/A





FJARDAÁL SMELTER PROJECT



BECHTEL INTERNATIONAL Inc

EMPLOYEE RELATIONS

SCHEDULE OF CONTRACTORS PRACTICES
and
PROJECT CODE OF CONDUCT & WORK RULES

				JOB	PROCEDURE NO.	
				24956		

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A handwritten signature in dark ink, appearing to be "J. R. Smith", written over the confidentiality notice.

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**SCHEDULE OF CONTRACTOR'S PRACTICES
AND
PROJECT Code Of Conduct & WORK RULES**

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SCHEDULE OF CONTRACTOR'S PRACTICES

This schedule forms part of the overall Project Employee Relations program requirements. No variation from the Practices contained herein shall be permitted without the written approval of an authorised officer of BECHTEL INTERNATIONAL (*Hereinafter throughout this document as BECHTEL*).

For the duration of the Fjarðaál Aluminium Smelter Project the authorised officers of BECHTEL are;

- The Bechtel Project Manager or designee;
- The Bechtel Contracts Administrator or designee;
- The Bechtel Employee Relations Advisor or designee.

Reference to the term CONTRACTOR herein is be deemed to include SUBCONTRACTOR of any tier. CONTRACTOR is responsible for its lower tier SUBCONTRACTOR compliance with the terms of this Schedule. Any breach by SUBCONTRACTOR lower tier CONTRACTOR shall be considered by BECHTEL to be a breach by CONTRACTOR.

1. CONTRACTOR MANUAL EMPLOYEES EMPLOYMENT TERMS

CONTRACTOR has established Employment Terms that will cover the period that CONTRACTOR manual employees are engaged in work on the Jobsite. These terms shall comply with Icelandic legal requirements and shall be approved by BECHTEL prior to the manual employees of the CONTRACTOR commencing on the Jobsite.

CONTRACTOR is responsible to ensure that before it enters into any contract with a lower tier CONTRACTOR that the lower tier SUBCONTRACTOR also has established Employment Terms that covers the period that the manual employees of each lower tier SUBCONTRACTOR is engaged on the job site. Similarly the Employment Terms of each lower tier SUBCONTRACTOR must have been approved by BECHTEL and comply with Icelandic legal requirements prior to entry into any contract by the CONTRACTOR with the lower tier SUBCONTRACTOR and prior to the manual employees of any CONTRACTOR'S lower tier SUBCONTRACTORS commencing on the Jobsite.

2. PROJECT EMPLOYMENT TERMS COMPLIANCE

CONTRACTOR shall at all times comply with the Employment Terms; in particular CONTRACTOR shall ensure that no payments or allowances other than those stipulated in the Employment Terms are paid.

BECHTEL has the right, at its absolute discretion to inspect, examine and audit CONTRACTOR'S time and remuneration records for the purposes of verifying compliance with terms of CONTRACTOR'S Employment Terms. Specifically, the following documents may be required to be provided by CONTRACTOR.

- Original timesheets;
- Original pay slips.
- Original documents dealing with the transfer of wages into

- employees' bank accounts.
- Official documents from funds such as Pension, Vacation etc detailing employer contributions.

3. EMPLOYEE RELATIONS MANAGEMENT PLAN

CONTRACTOR shall develop an Employee Relations Management Plan and require each of its lower tier SUBCONTRACTORS to develop their own Employee Relations Management Plan, which as a minimum shall address the following elements.

- Communication processes that will be followed.
- Employment/recruitment procedures and processes
- Management Systems that CONTRACTOR will pursue to;
 - Achieve desired leadership behaviours from it's leadership personnel
 - Deal with inappropriate behaviour
 - Gain compliance with the Employment Terms and the Project Code of Conduct & Work Rules
 - Establish performance expectations and recognition of achievement
 - Apply continuous improvement philosophy and processes
- Training programs that CONTRACTOR will follow.

4. HOURS OF WORK AND WORK BREAKS

CONTRACTOR shall comply with the Project hours of work and work breaks in accordance with the Employment Terms.

Variation to Project work hours shall only occur with BECHTEL'S prior approval. Variation to work breaks shall only occur in line with the provisions of CONTRACTOR Employment Terms.

5. ADDITIONAL TIME

CONTRACTOR shall only work outside the Project work hours in addition to that stipulated in 4 above, with BECHTEL'S prior approval.

CONTRACTOR shall strictly adhere to the terms of its Employment Terms in respect of overtime or additional worked time.

6. TIMEKEEPING

Standard project work hours are 6.30am start and 5.15pm completion or as determined by CONTRACTOR. CONTRACTOR is responsible to ensure that all of its employees are ready to work at their respective work areas at the start time at the beginning of each day or shift. A fair and reasonable time is to be allowed for wash-up prior to the commencement of each work break and at the completion of the workday. Unless there are special requirements, fair and reasonable time referred to above is not expected to exceed five minutes in any given period.

CONTRACTOR is responsible and is required to ensure that its leadership team monitors their team's work breaks and start and finish times.

7. PAYMENT

Payment shall not be made for time not worked (excepting authorised absence) within the terms of CONTRACTOR'S Employment Terms without BECHTEL'S prior approval.

8. AMENITIES

Cleaning and Maintenance of Amenities

Where CONTRACTOR is obligated under the terms of this contract to supply toilets, washing facilities and or meal rooms, those facilities shall be of a standard acceptable to BECHTEL and shall require BECHTEL'S approval prior to transporting onto the Jobsite. CONTRACTOR is required to maintain and clean any toilets or washing facilities it brings onto the Jobsite to a standard acceptable to BECHTEL.

CONTRACTOR is required to maintain and clean meal rooms whether supplied by CONTRACTOR or BECHTEL to a standard acceptable to BECHTEL.

Supplied - Consumables

CONTRACTOR shall ensure the adequate supply of consumables in accordance with the provisions of CONTRACTOR'S Employment Terms, including but not limited to, disposable cups and spoons, tea, coffee, sugar, milk.

General

Unless otherwise directed by BECHTEL, CONTRACTOR shall not utilise any other facilities or amenities.

9. EMPLOYEE RELATIONS RESPONSIBILITIES

BECHTEL Responsibilities

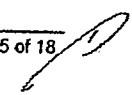
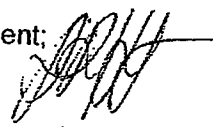
BECHTEL will:

- Represent the Project in respect of any employee relations matter impacting on the work or in BECHTEL'S view having the potential to impact the Project as a whole;
- Assist CONTRACTOR to achieve the desired employee relations outcomes for the mutual benefit of CONTRACTOR'S employees, CONTRACTOR, BECHTEL and OWNER;
- Convene meetings from time to time to facilitate communication and co-operation in respect of employee relations issues;
- If considered necessary, direct CONTRACTOR in respect of employee relations issues.

CONTRACTOR Responsibilities

CONTRACTOR will:

- Provide a safe and healthy place of employment;



- Be solely responsible for compliance with the Employment Terms and this Schedule and for maintaining excellence in employee relations;
- Immediately advise BECHTEL EMPLOYEE RELATIONS ADVISOR of any employee relations issue which impacts, or has the potential to impact CONTRACTOR'S work;
- Co-operate with BECHTEL and other CONTRACTORS in the pursuit of Project employee relations outcomes;
- Comply with any direction issued by BECHTEL;
- Nominate BECHTEL as its representative in respect of any employee relations matter considered by BECHTEL to impact, or have the potential to impact CONTRACTOR'S work or the Project as a whole;
- Not make any commitment on any employee relations matter that relates to remuneration for employees covered by CONTRACTOR'S Employment Terms, interpretation of employment terms or working conditions without the prior approval of the BECHTEL EMPLOYEE RELATIONS ADVISOR.
- CONTRACTOR shall ensure that BECHTEL EMPLOYEE RELATIONS ADVISOR is immediately advised of any work stoppage, ban or limitation of work, actual or potential.

Joint Responsibilities

BECHTEL and CONTRACTOR will jointly strive to achieve and maintain an employee relations environment that is conducive to:

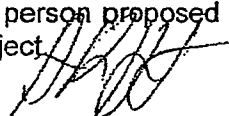
- Maintaining a safe and healthy work environment;
- Respect for the individual;
- Desired leadership behaviour;
- Desired employee behaviour;
- Maximising productivity;
- Employee development;
- People working to the full extent of their capability;
- Recognition of individual and team performance.

10. ENGAGEMENT OF LABOUR

CONTRACTOR shall only employ/assign competent and qualified management, supervisory, Construction and craft employees for the performance of work on its subcontract and will administer its employment processes professionally.

CONTRACTOR is required to engage all employees in accordance with the Project Employment Procedures. This will be administered through the BECHTEL EMPLOYEE RELATIONS ADVISOR. Any offers of employment by CONTRACTOR for work on or in connection with the Project shall only be made in accordance with the Project Employment Procedures and in conjunction with the BECHTEL EMPLOYEE RELATIONS ADVISOR.

BECHTEL has the right of veto any person proposed by CONTRACTOR for work on or in connection with the Project.



BECHTEL may, at its absolute discretion, require the removal of any CONTRACTOR employees engaged on or in connection with the Project on the grounds of inefficiency, neglect of duty, misconduct or serious breach of Project safety and environmental requirements.

11. MEDICAL EVALUATION FOR SAFETY

Except when working on a temporary work permit, all CONTRACTOR employees are required to undertake a Medical Evaluation for Safety (MEFS) before commencing work on the Jobsite. Failure to obtain a satisfactory result through the MEFS will mean that access to the Jobsite will be declined with the result being that the employee candidate will not be able to work on the Project.

All employees engaged on Fjarðaál Aluminium Smelter Project will be subject to random and "for cause" testing for alcohol and drugs. Failure to obtain a satisfactory result will mean that access to the Project will be declined with the result being that the employee candidate will not be able to work at the Project.

12. TRANSFER OF LABOUR AND LABOUR POACHING

CONTRACTOR shall not approach, engage or solicit any BECHTEL, OWNER or other CONTRACTOR employees or any agents working on behalf of any of the above without BECHTEL's prior approval.

Should CONTRACTOR have more than one subcontract on the Jobsite, employees shall not be transferred from one subcontract to another without BECHTEL EMPLOYEE RELATIONS ADVISOR'S prior approval.

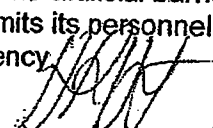
Should CONTRACTOR be engaged in maintenance or other work for the OWNER or its agents on the Jobsite, CONTRACTOR shall not transfer employees from such work to work within the scope of CONTRACTOR, or vice versa, without BECHTEL EMPLOYEE RELATIONS ADVISOR'S prior approval.

13. REPRESENTATION, COMMUNICATION AND REPORTING

CONTRACTOR'S Representative shall represent CONTRACTOR in employee relations matters, be responsible for communications with BECHTEL and shall have the authority to commit CONTRACTOR on employee relations matters.

14. WORK TO COMPETENCY

There are no demarcation or other artificial barriers to the utilisation of skills, tools, machinery and/or equipment in the performance of work on the Project. CONTRACTOR shall ensure that no artificial barriers exist or be allowed to exist within its subcontract that limits its personnel from working to the maximum extent of their competency.



15. INCLEMENT WEATHER

CONTRACTOR will continue to work during periods of inclement weather where it is practicable to do so and providing the work areas remain in a state that does not cause unsafe conditions or behaviours. Should CONTRACTOR require clarification of this situation they should contact the BECHTEL PROJECT SAFETY MANAGER. In company with other BECHTEL and CONTRACTOR Representatives, the BECHTEL PROJECT SAFETY MANAGER will conduct an inspection of the work area(s) to determine their safeness for continuance of work. Alternatively, CONTRACTOR will undertake other duties, as appropriate to their work scope and needs, during periods of inclement weather.

CONTRACTOR shall comply with the Employment Terms in that employee's ordinary (day) work hours will not be changed or reduced due to periods of inclement weather.

16. PROJECT LEADERSHIP TRAINING

BECHTEL has established a leadership model that defines the characteristics and expectations of good leaders. CONTRACTOR is expected to work to ensure that all of its employees who are placed in leadership roles behave in a manner consistent with the Project expectation of leaders.

BECHTEL will conduct Project Leadership training. It is mandatory that CONTRACTOR makes available all of its employees who will have a position of leadership on the Project to undertake Project Leadership training. It is intended that this completion of Leadership Training be a prerequisite to assuming any leadership role on the Project.

CONTRACTOR shall also make available all employees, who may not be in a role of leadership, to attend Project Briefings on the Leadership Program.

17. PERFORMANCE EXCELLENCE PROGRAM

BECHTEL will operate a Performance Excellence Program on the Project.

The program is designed to effect good Project communication systems, recognise individual and team excellence and develop appropriate workplace culture that reflects the individual and team commitment to safety and the Project's success.

CONTRACTOR shall embrace concepts of the Performance Excellence Program and cooperate with BECHTEL in implementing the various elements of the program. CONTRACTOR shall make all its employees available to participate in the Performance Excellence Program as required by BECHTEL.

18. ACCOMMODATION

BECHTEL shall manage and administer all accommodation needs and allocations for all CONTRACTOR non-local project personnel employed on a full time basis.

The determination of a non-local employee will be based on each employee's declaration of usual place of residence on the project Registration of Interest for Employment form.

Accommodation conditions for CONTRACTOR manual and non-local, non-manual employees will comply with BECHTEL'S Project Accommodation Procedure.

20. TRANSPORTATION

Employee vehicles are not permitted on to the Jobsite.

CONTRACTOR vehicles will not be permitted on to the Jobsite without a vehicle permit issued by Project Site Control. Vehicle permits will be limited and shall be restricted to operational vehicles. No permits will be issued for sedans.

21. SECURITY AND SITE CONTROL

BECHTEL shall operate a Project Security and Site Control system that will include control of access to the Jobsite.

Each CONTRACTOR employee shall be issued with a Jobsite Access identification badge by BECHTEL at no cost to CONTRACTOR provided that CONTRACTOR will be back charged 3000 ISK for each identification badge it requires to be replaced or does not return to the Project at the termination of each CONTRACTOR employee.

CONTRACTOR shall ensure absolute compliance with BECHTEL'S Project Security and Site Control Procedures. CONTRACTOR is required to establish and submit to BECHTEL for approval, a Security & Site Control Program to control the security of its facilities, plant and equipment. The Security & Site Control Program shall include but not be limited to:

- A Plant/Equipment/Tools register including description, make, model, serial number and the CONTRACTOR'S plant number or branded markings.
- A system of daily lock-up of offices, amenities, containers, toolboxes, plant, etc., including the nomination of whom within CONTRACTOR'S organisation is responsible for security of this system
- A Security & Site Control procedure to protect CONTRACTOR tools, plant and equipment and the tools of CONTRACTOR'S employees during work breaks.
- Requirement to report to BECHTEL in the prescribed manner, any actual or possible events of theft, loss or vandalism of any property of the CONTRACTOR or its employees.

22. EMPLOYER ASSOCIATION

BECHTEL may, at its discretion, nominate an Employer Association to provide advice to the Project on industrial regulation.

23. PERSONAL PROTECTIVE CLOTHING AND EQUIPMENT

CONTRACTOR will ensure that it provides a BECHTEL approved project issue of the following protective clothing to its full time (more than 4 weeks employment) employees. CONTRACTOR should ensure that project employees wear protective clothing and footwear at all times while on the Jobsite. Protective clothing shall consist of:

- Safety footwear
- 3 overalls or 3 long trousers or 3 long sleeved shirts
- Safety hardhat
- Safety glasses
- Insulated overall or insulated jacket

CONTRACTOR shall not issue any additional clothing and/or footwear to that stated above to any of its employees engaged in work on the Jobsite. However the issue of gloves, spats, etc. and any specific safety equipment appropriate to CONTRACTOR employee's work scope remains the responsibility of the CONTRACTOR.

24. PERSONAL BEHAVIOUR

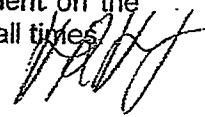
BECHTEL has established Project Work Rules that CONTRACTOR shall adopt and enforce. A copy of the Project Work Rules is attached to this Schedule of CONTRACTOR Practices. CONTRACTOR is responsible and accountable for the behaviour of its employees and shall administer any disciplinary action in accordance with its Employment Terms.

25. EMPLOYEE RELATIONS BULLETINS

BECHTEL may issue Employee Relations Bulletins. These bulletins will be used both to communicate information and to convey instructions. CONTRACTOR shall immediately implement any instruction so conveyed.

26. REVISIONS

BECHTEL may revise this Schedule at any time in order to maintain a safe and healthy work place and a good employee relations environment on the Project. CONTRACTOR is obligated to adhere to this Schedule at all times.



FJARÐAÁL SMELTER
PROJECT CODE OF CONDUCT AND WORK RULES

FJARÐAÁL SMELTER PROJECT



PROJECT CODE OF CONDUCT & WORK RULES

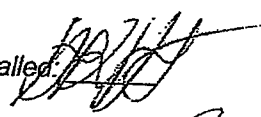
You are required to read, and understand, the
Project Code of Conduct & Work Rules and to signify your acceptance.

The Project Code of Conduct & Work Rules forms part of your
Contract Of Employment.

Failure to adhere to the Project Code of Conduct & Work Rules may result in
disciplinary action which may include termination of your
Contract Of Employment.

Appendix A-4

Document number: 24956-600-FC3-EMC0-00001

Employee Initialled: 

Page 11 of 18 

**FJARDAÁL SMELTER
PROJECT CODE OF CONDUCT AND WORK RULES**

IMPORTANT: This document forms part of your Contract Of Employment. You are required to carefully, and thoroughly, read its contents. After you have finished reading this document, and have had your questions or points raised clarified, you are required to place your signature in the position provided on the final page. Your signature is your acknowledgement to your employer that you have read, comprehend and are prepared to accept and abide by this PROJECT CODE OF CONDUCT & WORK RULES.

All Project employees are required to adhere to the Project Code of Conduct & Work Rules when employed on the jobsite. This also relates to conduct in the construction car park, on project-supplied transport and while living in project-supplied accommodation (refer separate Accommodation Code of Conduct, as applicable to non-local employees).

Accountability

Each employee is accountable for:

- Complying with Project Environmental, Safety and Health regulations, procedures and practices and for taking responsibility for their own personal safety and the personal safety of other team members;
- Their own personal fitness for work;
- Complying with the terms of the Project Partnership Agreement;

Instructions

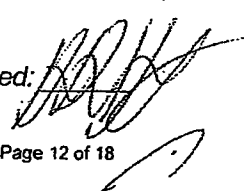
It is important that each employee follows all lawful instructions given by their supervisors. If an employee is not able to perform any task, for any reason whatsoever, they must inform their Supervisor immediately.

Refusal to comply with any lawful instruction may result in disciplinary action.

Project Hours of Work

- Each employee is responsible for his or her own timekeeping and punctuality
- Employees are expected to be at their respective work areas at start time
- Employees should allow an appropriate amount of time to ensure the integrity and safety of the work areas; pack up and wash up by the completion of work time.

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Employee Initialled: 

**FJARDAÁL SMELTER
PROJECT CODE OF CONDUCT AND WORK RULES**

Standard work hours are:

- **Start at:** 6.30am **Finish at:** 5.15pm = Onsite for 10.75 hours
- Paid for 10 hours (one 35 minute break is paid, the second 45 minute break is unpaid)
- **Work Cycle:** Week 1 Monday to Saturday (Sunday off)
Week 2 Monday to Saturday (Sunday off)
Week 3 Monday to Thursday (Friday, Saturday and Sunday off)

Personal Protective Equipment (PPE)

All employees (employed for more than 4 weeks) shall be issued with protective clothing and footwear for their personal safety protection (long sleeved shirts and long trousers or overalls, Insulated overall or jacket, safety helmet, safety glasses, steel-toed boots).

Where facilities require additional protective equipment to be worn, for example hearing and respiratory protection; the employer will supply such items. These areas will be marked and the required protection must be worn.

Issued PPE items will be replaced on a fair wear and tear basis upon production of the worn item to the employer.

NOTE: It is a Project requirement that PPE shall be worn at all times, other than inside lunch facilities and offices. If an employee loses any item of PPE, additional items may be purchased at the employee's cost.

Security and Site Control

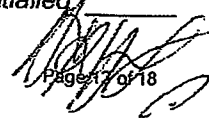
All employees are required to comply with all aspects of the Project Security and Site Control Program. Access to the site for all employees will be only via the project designated access gates.

Information relevant to site access and directions to each employee's work area on the project will be identified at the Project Orientation. Employees are prohibited from authorised to visiting other work areas on the jobsite unless instructed to do so by the employee's immediate Supervisor.

All vehicles and carry in bags may be subject to random security search by CONTRACTOR Site Control personnel. All materials or property (other than the employee's personal property) removed from site require an approved Security-Exit Gate Pass. No tools or equipment will be loaned out.

Appendix A-4

Employee Initialled:


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**FJARDAÁL SMELTER
PROJECT CODE OF CONDUCT AND WORK RULES**

Only visitors approved through CONTRACTOR Site Control, and who have attended the Project Visitor Safety Induction, will be authorised to access the jobsite.

Identification Badge

Each employee will be supplied with a Personal Identification Badge for site access. Employees must have their Personal Identification Badge in their possession at all times. It must be displayed at all times when on the Project site as it will be required to gain entry onto the project and to use project supplied transportation. At any other time, upon request by a CONTRACTOR representative, an employee may be required to produce the Project Identification Badge, for purposes of identification.

Use of another employees Identification Badge is not permitted and breaches may result in disciplinary action, which may include termination of employment on the Project.

Employees must report any loss of their identification badge to CONTRACTOR Site Control.

At the conclusion of employment on the Project employees must return their badge to their employer for return to the Project Employee Relations Advisor.

Site Road Rules

Iceland road rules apply on all site roads unless overridden by specific rules such as the speed limits defined on posted signs. All drivers on the Project must hold a current Iceland Driver's Licence.

Carpark

Private vehicles are not allowed at the construction site, all private vehicles must be parked at the designated car park.

The right to park a vehicle in the construction car park may be revoked, if, in CONTRACTOR's opinion, a driver of a vehicle is driving to/from work or in the car park itself, in a manner which is dangerous to either him/herself and/or other road users.

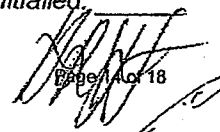
Cameras / Video Cameras

Cameras / video cameras and the taking of photographs / videos are not permitted on the jobsite without prior approval of CONTRACTOR Project Management.

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Document number: 24956-600-FC3-EMC0-00001

Employee Initialled:


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**FJARDAÁL SMELTER
PROJECT CODE OF CONDUCT AND WORK RULES**

Children

Children under 16 years of age are not permitted on the jobsite without the express approval of CONTRACTOR Project Management.

Gambling/Raffles

Gambling is not permitted on the jobsite. Lotteries or raffles are not permitted unless CONTRACTOR Project Management has given specific approval.

Selling/Bill Posting

The selling of merchandise or services on the jobsite is not permitted. Distribution and/or posting of bills, pamphlets, etc. are not permitted.

Mobile Phones

The use of mobile phones is banned by all project personnel at all fieldwork locations due to potential distraction from safety awareness.

Fitness for Work

A policy for 'Fitness for Work' applies on the jobsite and part of this policy consists of both random and 'for cause' on site testing for alcohol and drugs. I agree to co-operate with the jobsite Fitness for Work policy and to submit to testing if requested in accordance with the terms of that policy.

Banned Items:

The following items are not permitted on the jobsite:

- Glass bottles
- Explosives
- Firearms
- Alcohol and illegal drugs
- Pornographic and/or sexually explicit material of any kind

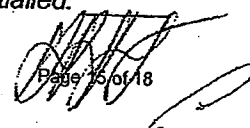
Misconduct

The following forms of behaviour do not align with the Project Objectives. Any behaviour as outlined below would constitute as misconduct; proven breaches of which will result in disciplinary action being taken in accordance with the Equitable Treatment System provisions of the Employment Terms. Proven repeat and/or multiple breaches of the following may result in termination of employment.

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FJARÐAÁL SMELTER
PROJECT CODE OF CONDUCT AND WORK RULES

Behaviour which constitutes 'misconduct' includes, but is NOT limited to the following:

- Breaches of project safety procedures and/or regulations that places, or has the potential to place, the safety of an individual employee or other members of the team at risk of injury.
- Irregular attendance
- Unauthorised absences
- Tardiness
- Failure to wear issued personal protective clothing, footwear and equipment
- Breach of Security and Site Control requirements
- Failure to report any injury/incident
- Practical jokes or acts of horseplay
- Gambling or the use of gambling devices
- Selling merchandise or services on the jobsite
- Unauthorised use of Company telephones or use of personal mobile phones during working hours in field work locations
- Taking unauthorised photographs / video
- Being absent from the workplace during a period in which a request for absence has been declined.

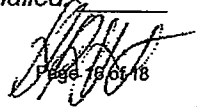
Serious Misconduct

The following forms of behaviour do not align with the Project Objectives. Any behaviour as outlined below would constitute as serious misconduct; proven breaches of which will result in disciplinary action being taken in accordance with the Equitable Treatment System provisions of the terms and conditions of employment which may include, after due investigatory processes being completed, termination of employment without notice.

Behaviour which constitutes 'serious misconduct' includes, but is NOT limited to the following:

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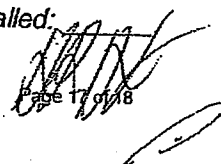
**FJARDAÁL SMELTER
PROJECT CODE OF CONDUCT AND WORK RULES**

- Breaches of project safety procedures and/or regulations which result in, or could have resulted in, serious and/or life threatening injury to an individual employee or other members of the team
- Irresponsible use or misuse of fire protection or safety equipment
- Possession or use of weapons or firearms
- Smoking in any designated 'No Smoking' area
- Alcohol and Drugs:
 - Reporting to work while under the influence of alcohol and/or drugs
 - Possession of, or use of, illegal drugs / substances
 - Illicit trade of alcoholic beverages and / or drugs
- Offensive, intimidating or violent behaviour in any form, regardless of how or why it was initiated.
- Vandalism or wilful damage or interference to company and/or personal property.
- Theft or removal off the jobsite of company and/or another employee's property.
- Unauthorized possession of company and/or another employee's property.
- Discrimination or harassment of any form, including that relating to race, colour, religion, sex, age, national origin, ancestry or handicap.
- Trespass, without permit, on any restricted access areas.
- Failure to comply with lawful and reasonable work instructions, including a refusal to perform assigned work, higher duties and/or alternative duties, etc.
- Immoral conduct
- Falsification of company records, regardless of when discovered, including timesheets, wage records, leave records, production reports, etc.
- Bringing unauthorised personnel onto the jobsite.

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**FJARÐAÁL SMELTER
PROJECT CODE OF CONDUCT AND WORK RULES**

**EMPLOYEE ACKNOWLEDEMENT OF THE
PROJECT CODE OF CONDUCT & WORK RULES**

This is to acknowledge I have read, understand and accept the Project Code of Conduct & Work Rules and acknowledge they form part of my Contract Of Employment whilst I am employed on the Fjarðaál Aluminium Project.

I acknowledge the Project Code of Conduct & Work Rules may be varied from time to time and that any such future changes will be communicated to me and form part of my contract of employment.

I acknowledge if I disregard or breach these obligations it may jeopardise my continued employment on this jobsite and Project.

Employee:

Name: _____
(Please Print)

Signature: _____ Date: ____/____/____

Witnessed By:

Name: _____
(Please Print)

Signed: _____ Date: ____/____/____

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Employee Initialled



FJARDAÁL SMELTER PROJECT

ACCOMMODATION CODE OF CONDUCT

You are required to make yourself familiar with these conditions of employment relating to your accommodation as set out herein and as amended from time to time.

Failure to adhere to accommodation rules may result in disciplinary action including withdrawal of allocated accommodation and/or termination of employment, in accordance with the Equitable Treatment System.

**KEEP YOUR ROOM LOCKED WHEN NOT
OCCUPIED AND KEEP YOUR KEYS WITH YOU
AT ALL TIMES.**

A handwritten signature in dark ink, appearing to be "H. H. H.", is written over the text "AT ALL TIMES".

A handwritten mark, possibly a stylized "P" or a signature, is located in the bottom right corner of the page.



FJARDAÁL SMELTER PROJECT
ACCOMMODATION CODE OF CONDUCT

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FJARDAÁL SMELTER PROJECT ACCOMMODATION CODE OF CONDUCT

This Accommodation Code of Conduct forms part of your contract of employment and shall be read and understood prior to signing.

You acknowledge that it is a condition of this Accommodation Code of Conduct and your contract of employment that:

- (a) the legal right to possession and control of the accommodation and Village remains vested in Bechtel at all times;
- (b) you have a personal right to boarding and lodging at the Village on the terms specified in this Accommodation Code of Conduct and terms of employment and you have no interest in nor any right of exclusive possession of the accommodation; and
- (c) no relationship of landlord and tenant exists between you and Bechtel nor shall any such relationship arise by virtue of the provision of accommodation at the Village.
- (d) this Accommodation Code of Conduct applies to your behaviour at the Village, whilst travelling to and from work, and in the local community.

REQUIREMENTS

1 Safety & Health

At all times, all persons within the Village must conduct themselves with due regard to the safety and health of themselves and other residents, workers and visitors. Activities or behaviours that place any person at risk of injury or illness will not be tolerated. Each person is responsible for their safety and the safety of those around them.

1.1 Emergency Procedures

You shall be inducted to the Village emergency evacuation procedures upon check-in.

In addition to this however you should take the time to study and understand the emergency procedures, Village lay-out, evacuation routes, assembly areas and be familiar with alarm signals in the event the Village, or any part of it, needs to be evacuated in an emergency.

Emergency evacuation procedures are located in your accommodation room and throughout the Village.

1.2 Precautions Against Fire

You shall be inducted to the location of fire prevention equipment and procedures upon check-in.

In addition to this you should familiarise yourself with the location of fire prevention equipment near your accommodation room and throughout the Village generally.



**FJARÐAÁL SMELTER PROJECT
ACCOMMODATION CODE OF CONDUCT**

Fire fighting equipment is to be used to fight fires only.

1.3 General Hygiene and Sanitation

Residents are required to leave laundry, toilet, washing and shower facilities in a reasonably clean condition after use. Unsanitary use of any facility and acts against acceptable hygiene standards is not acceptable.

Be constantly vigilant in fire prevention. Potential cause of fire and fires are to be reported immediately to the catering contractor Resident Manager and/or the Bechtel Village Supervisor.

2 Identification Badges

Your identification badge is required to be presented, upon request, to representatives of the catering contractor, the Bechtel Village Supervisor and/or Bechtel Site Control Officers (Security).

3 Messing

Meals will be provided in the dining hall during the published times. Meal service will NOT be provided outside of published times unless Bechtel has approved prior arrangements.

Access to dining hall is by means of a proximity card (refer to item No. 8) that is supplied to all residents upon arrival at the Village Office. Residents may not use another person's proximity card, or loan their card out to another person.

Crib will be available during the breakfast dining period. A lunch box will be made available to each resident - these must be returned to Village Office on final departure.

Meals and foodstuffs (other than cribs for personal consumption) are not to be taken out of the dining hall without specific prior approval of the catering contractor management.

Crockery, cutlery, utensils and items or materials of any kind are not to be removed from the dining hall.

Alcohol is not to be taken into or consumed in the dining hall.

Minimum dress requirements for ALL residents and visitors in the dining hall MUST be adhered to. Work clothing worn into the dining hall must be of a reasonable clean condition.

4 Accommodation

The catering contractor will allocate accommodation rooms on arrival. No room changes will be permitted without the prior approval of catering contractor Management. All occupants must have prior residency approval authorised by the Bechtel Village Supervisor.

Accommodation rooms are provided on the basis of one person to a room to the authorised occupant during employment on the Project.



**FJARDAÁL SMELTER PROJECT
ACCOMMODATION CODE OF CONDUCT**

Authorised occupants are not permitted to share rooms or to allow unauthorised persons to live or overnight in the Village.

All residents must "check in" through Village Office on arrival and "check out" via same when commencing R & R.

Upon permanently vacating the Village residents are to return all issued items (as described below), otherwise the person concerned may incur charges.

Departing residents, if occupancy termination is satisfactory, will be issued with a 'Facility Clearance'.

Occupants checking out for the final time should leave forwarding address for mail.

Rooms will be serviced twice per week, on a day nominated by the catering contractor. Bed linen and towels will be changed twice a week.

Authorised persons for fire safety, hygiene control and maintenance purposes will regularly inspect rooms.

No structural alteration, removal or rearrangement of fixtures, alteration or extension of electrical wiring or circuits is permitted without the consent of the catering contractor Resident Manager.

Each resident will be allocated the following items in good order and clean condition:

- ☐ Two (2) pillows and pillow cases
- ☐ Two (2) single bed sheets
- ☐ One (1) mattress protector
- ☐ Two (2) bath towels
- ☐ One (1) doona & doona cover
- ☐ One (1) sealable jug and one (1) drinking glass
- ☐ One (1) waste paper basket

Accommodation rooms are to be maintained in a clean and hygienic condition by occupants between bi-weekly services. A mop, bucket and broom will be available for this purpose in each accommodation area.

Cooking and the preparation of food in accommodation rooms is prohibited.

5 Resident Visitors

For reasons of security and safety, a system of authorisation and induction of visitors shall operate at the Village. Only authorised visitors shall be permitted access to the Village grounds or allowed remaining on Village grounds.

The resident shall obtain authorisation from the Bechtel Village Manager by way of submission to the Bechtel Village Manager, the *Visitor Notification and Approval* form (attached). Such form shall be submitted prior to the date of desired visit.

Visitor behaviour is the responsibility of the host whilst on Village grounds. The provisions of the Accommodation Code of Conduct shall apply to all visitors. Visitors are not permitted to remain on Village grounds after 10pm on any day.



FJARDAÁL SMELTER PROJECT ACCOMMODATION CODE OF CONDUCT

6 Reporting Defects

To ensure defects are corrected in a timely manner, residents must report defects and malfunction of any equipment/facility to the catering contractor Resident Manager, in the logbook provided at the Village Office or in the Maintenance book in the dining room.

7 Personal Property

Bechtel and the catering contractor will not accept any responsibility or liability for any claims in respect of resident's personal belongings. Bechtel recommends that residents should insure their personal belongings against fire, theft etc.

8 Keys and Proximity Cards Cost to Resident

A Key will be provided for your accommodation room. Also, a Proximity Card will be issued for the purpose of access to the Dining Hall. If key or card is lost, the loss is to be immediately reported to the Village Office where a new key or card will be issued. In the event of such a loss of either key or card, the resident/contractor will incur a charge for each replacement. Damaged cards will be replaced free of charge.

9 Recreational Facilities

Recreational Facilities are available for residents during specific hours and persons utilising these facilities must, as with the dining hall, be properly attired.

The Recreational Facilities and equipment is for specific use of authorised residents and authorised visitors only.

10 Vehicles and Parking

Only approved vehicles may enter or be parked within the Village confines. Requests for access/parking must be in writing to Village Caterers on the form available from Village office.

All vehicle owners must observe the posted speed limit signs erected within the Village. Vehicles are to be parked in the designated parking areas. No vehicles are to be parked outside the accommodation units.

The right to park your vehicle in the Village Car Park is a privilege. Such privilege may be revoked on an individual basis where, if in the opinion of Bechtel, a driver of a vehicle is driving to / from the Village, in the local community or in the Village car park itself, in a manner which is dangerous to either him/herself and, or other road users.

Bechtel and the Village Catering Managers accept no responsibility or liability for any damage to or loss of property or vehicles within the confines of the Village, including parking areas. It is recommended that residents have personal insurance coverage for any vehicles or personal property they may bring into the Village.

Instances of dangerous driving may, subject to investigation, result in disciplinary action in accordance with the Equitable Treatment System.

Unroadworthy and/or derelict vehicles are not permitted on Village property.

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FJARDAÁL SMELTER PROJECT ACCOMMODATION CODE OF CONDUCT

Vehicles are not to be maintained on Village grounds; also the use of degreasers or other cleaning agents are not permitted.

11 Notice Boards

Notices may not be placed or posted except on the three Main Notice Boards and only with prior approval of the catering contractor Resident Manager. Any notices so approved shall be periodically removed.

Personal notices such as "wanted to buy / sell", can be placed on the notice boards in the laundry buildings and also on the residents notice board outside the dining hall. These notices shall also be periodically removed.

12 Prohibited Items

Prohibited items on Village grounds include, but are not limited to the following:

- ☐ The possession of, or use of, firearms, ammunition, weapons and explosive devices.
- ☐ Glassware, including glass containers and/or vessels, of any kind, are prohibited in the Village.
- ☐ Possession of, and or use of, any illegal drug or substance, corrosive or obnoxious substances of like matter.
- ☐ Animals, fish or live pets of any kind.
- ☐ Any illegal items, implement, subject matter whatsoever.
- ☐ Any fuel, oils in any container also fuel powered motors such as a generators are prohibited in accommodation rooms
- ☐ Vehicle batteries are prohibited in accommodation rooms
- ☐ Any extraneous material left close or adjacent to Village buildings or in the Village grounds will be relocated for collection and future removal.
- ☐ Posting on any wall or placing in public view, including your accommodation room, pornographic material, or material of a like nature which could give offence to others.

13 Complaints

Concerns regarding any service performed by the catering contractor should, in the first instance, be referred to the catering contractor Resident Manager. Where an issue remains unresolved it should be elevated to the Bechtel Village Supervisor.

14 Suggestions and Comments Book

Residents are invited to offer constructive suggestions for improvements to Village life by way of Suggestion Boxes located in the Recreation Room and the Dining Hall. Meal comments and suggestions may be written in the Comments Book provided at the exit of the Dining Hall. All comments in this book should include the resident's name and room number. Any person found to be tampering with, using offensive language in written comments, or defacing the Comments Book will be dealt with in accordance with the terms of the equitable treatment system.

A handwritten signature in dark ink, appearing to be "M. J. Smith", located below the text of section 14.



FJARDAÁL SMELTER PROJECT ACCOMMODATION CODE OF CONDUCT

15 Standards Of Behaviour & Village Rules

Conformity with normal accepted standards of community behaviour and this Accommodation Code of Conduct is expected in the Village and the local community for the benefit and well being of all residents. Unacceptable conduct in the Village will not be tolerated and will be treated as misconduct or serious misconduct.

15.1 Misconduct

The following forms of behaviour constitute MISCONDUCT; proven breaches of which may result in disciplinary action being taken in accordance with the Equitable Treatment System provisions of the certified agreement applicable to you. Proven repeat and/or multiple violations which may encompass different types of misconduct, may result in withdrawal of accommodation entitlement and/or termination of employment.

Behaviour which constitute 'misconduct' includes, but is NOT limited to the following:

- ☐ Unsanitary use of any facility such as urinating on the ground, and acts against acceptable hygiene standards
- ☐ Practical jokes or acts of horseplay.
- ☐ Gambling or the use of gambling devices
- ☐ Undertaking oil changes and other lubrication work that has the potential to cause environmental damage.
- ☐ Riotous, drunken or noisy behaviour.
- ☐ Provocative or insulting language or offensive behaviour
- ☐ Causing a nuisance to others, or causing a disturbance.
- ☐ Failure to report an injury or incident.
- ☐ Posting on any wall or placing in public view, including accommodation your room, pornographic material, or material of a like nature which could give offence.
- ☐ Refusal to present Identification Badge when requested.
- ☐ Refusal to adhere to Dining Hall registering procedures, (e.g. use of proximity access card,) and/or rules.
- ☐ Jeopardising Project harmony by displaying banners, stickers, flags, or insignia relating to political parties, lobby groups, special interest groups or other associations that could give offence to others.
- ☐ Failure to maintain your accommodation room, and ablution facilities in a clean and hygienic condition.
- ☐ Unauthorised use of Company communications, Internet or telephones.
- ☐ Failure to observe dress code in the Dining Hall.
- ☐ Breaches of this Accommodation Code of Conduct,
- ☐ Bringing unauthorised visitors into the Village.

15.2 Serious Misconduct

The following forms of behaviour constitute SERIOUS MISCONDUCT; breaches of which may result in disciplinary action that may include, after due investigatory processes being completed, withdrawal of accommodation entitlement and/or termination of employment without notice.



**FJARDAÁL SMELTER PROJECT
ACCOMMODATION CODE OF CONDUCT**

Behaviour which constitutes 'Serious Misconduct' includes, but is NOT limited to the following:

- ☐ Negligence or wilful acts that cause and/or have the potential to cause fire.
- ☐ Smoking in designated non-smoking areas, which includes all accommodation rooms, ablution facilities, recreation rooms and the dining hall.
- ☐ Inappropriate use, tampering, wilful damage to fire fighting equipment, including fire extinguishers, smoke detectors in accommodation rooms, fire alarms, fire hoses.
- ☐ Abuse of, or damage to, Village facilities and amenities.
- ☐ Practical jokes or acts of horseplay.
- ☐ Fighting, and/or offensive, intimidating or violent behaviour in any form (either initiating and/or in response to actions of another).
- ☐ Harassment of any kind (including on the basis of gender, sexual orientation, religion, race, ethnicity, colour, ancestry, age, impairment)
- ☐ Inciting or abetting others to commit offences
- ☐ Possessing or using firearms, dangerous weapons, explosives, illegal drugs, corrosive or noxious substances of like matter
- ☐ Conducting or participating in any illegal activity or act
- ☐ Vandalism, wilful damage, misuse/abuse or interference to company and/or personal property.
- ☐ Illicit trade of alcoholic beverages and / or drugs
- ☐ Possessing or consuming intoxicating liquor in the dining hall, in vehicles and in areas of the local community where consumption of alcohol is not permitted.
- ☐ Theft of, or unauthorised use of, property belonging to another person, Bechtel, or the catering contractor.
- ☐ Wilful refusal to comply with safety, security, hygiene, environmental and/or accommodation rules and/or instructions.

16 General

Bechtel reserves the right at its absolute discretion to withhold offers of accommodation and/or to withdraw accommodation from any individual.

A stylized, handwritten signature in black ink, appearing to be a cursive representation of a name.

A stylized, handwritten signature in black ink, appearing to be a cursive representation of a name.



**FJARÐAÁL SMELTER PROJECT
ACCOMMODATION CODE OF CONDUCT**

17 ACKNOWLEDGEMENT

I understand and accept the Accommodation Code of Conduct as part of my contract of employment on the Fjarðaál Aluminium Smelter Project.

I understand that the Accommodation Code of Conduct may be varied from time to time and that any such future changes will be communicated to me and form part of my contract of employment.

I further understand that if I breach this Accommodation Code of Conduct it may result in the withdrawal of entitlement to accommodation and/or jeopardise my continued employment on the Fjarðaál Aluminium Project.

I acknowledge that I am being provided with lodging and boarding as part of my terms of employment and such right to lodging and boarding will cease immediately upon ceasing employment on the Project.

NAME:

INITIALLED:

SIGNATURE:

DATE:

____/____/____

WITNESS – PRINT NAME

SIGNATURE:

DATE:

A handwritten signature in black ink, appearing to be "DRH".

____/____/____



Bechtel International, Inc. (Icelandic Branch)

Fjarðaál smelter project

EXHIBIT "B"

SPECIAL CONDITIONS

SC-1 MODIFICATIONS TO EXHIBIT "A"

The following modifications to Exhibit "A" apply to this Contract:

1. **INDEPENDENT CONTRACTOR:** CONTRACTOR is an independent contractor and all persons employed by CONTRACTOR in connection with this contract shall be its employees or associated and partner companies and not employees of BECHTEL or OWNER in any respect.
3. **LAWS, REGULATIONS, PERMITS AND TAXES:** All applicable laws, ordinances, statutes, rules, regulations, orders or decrees in effect at the time the Work under this contract is performed shall apply to CONTRACTOR and its employees and representatives.

Except as otherwise specified, CONTRACTOR shall procure and pay for all permits, licenses, certifications and other applicable governing authority requirements and inspections and shall furnish any documentation, bonds, security or deposits required to permit performance of the Work.

Except as otherwise specified, CONTRACTOR shall pay all taxes, levies, duties and assessments of every nature due in connection with the Work and shall make any and all payroll deductions and withholdings required by law in France and in Iceland.

4. **LABOR, PERSONNEL AND WORK RULES:** CONTRACTOR shall employ only competent and skilled personnel to perform the Work and shall remove from the Jobsite any CONTRACTOR personnel determined to be unfit or to be acting in violation of any provision of this contract. CONTRACTOR is responsible for maintaining labor relations in such manner that there is harmony among workers and shall comply with and enforce Project and Jobsite procedures, regulations, work rules, and work hours established by BECHTEL and OWNER.

OWNER may at its sole discretion, directly or through BECHTEL as its Agent, deny access to the Jobsite to any individual by written notice to CONTRACTOR. In the event an employee is excluded from the Jobsite, CONTRACTOR shall promptly in an agreed upon time replace such individual with another who is fully competent and skilled to perform the Work.

CONTRACTOR shall, to the extent permissible under applicable law, comply with the provisions of all labor agreement(s) which apply to the Work performed under this contract. If required by the terms of any such labor agreement(s), CONTRACTOR shall, immediately after contract award, agree to comply with and be bound by the terms of such labor agreement(s).

8. **WARRANTY:** CONTRACTOR warrants to BECHTEL and OWNER that equipment and materials furnished under this Contract shall be new, of clear title and of the most suitable grade of their respective kinds for their intended uses, unless otherwise specified. All workmanship shall be first class and performed in accordance with sound construction practices acceptable to BECHTEL. All equipment, materials and workmanship shall also conform to the requirements of this Contract.

CONTRACTOR warrants all equipment and material it furnishes and all work it performs against defects in design, equipment, materials or workmanship for a period from Work commencement to a date twelve (12) months after completion and acceptance of the Fjarðaál project as a whole. If at any time during the warranty period, BECHTEL, OWNER, or CONTRACTOR discover any defect in the design, equipment, materials, or workmanship immediate written notice shall be given to the other parties. CONTRACTOR shall within a reasonable time propose corrective actions to cure such defects to meet the requirements of this Contract.

BECHTEL, at its sole discretion, may direct CONTRACTOR in writing and CONTRACTOR agrees to:

~~CONTRACTOR shall perform~~ rework, repair, or remove and replace defective equipment and materials or reperform defective workmanship to acceptable quality at an agreed upon time and in a manner acceptable to BECHTEL.

Should CONTRACTOR not perform corrective actions in the agreed upon time or in a manner acceptable to BECHTEL then BECHTEL, at its sole discretion, may direct CONTRACTOR in writing and CONTRACTOR agrees to:

2. 1. Cooperate with others assigned by BECHTEL to correct such defects and pay to BECHTEL all actual costs reasonably incurred by BECHTEL in performing or in having performed corrective actions; or
3. 2. Propose and negotiate in good faith an equitable reduction in the Contract price in lieu of corrective action

All costs incidental to corrective actions including demolition for access, removal, disassembly, transportation, reinstallation, reconstruction, retesting and reinspection as may be necessary to correct the defect and to demonstrate that the previously defective work conforms to the requirements of this Contract shall be borne by CONTRACTOR.

CONTRACTOR further warrants any and all corrective actions it performs against defects in design, equipment, materials and workmanship for a period of twelve (12) months, in addition to any existing warranty period, following acceptance by BECHTEL of the corrected work.

9. INDEMNITY: To the extent extent caused, occasioned or contributed to by CONTRACTOR's, its lower tier suppliers, subcontractors or of anyone acting under its direction or control or on its behalf's act, omission, fault or negligence, whether active or passive, CONTRACTOR hereby releases and shall indemnify, defend and hold harmless BECHTEL, OWNER and their subsidiaries and affiliates and the officers, agents, employees, successors and assigns, and authorized representatives of all the foregoing from and against any and all suits, actions, legal or administrative proceedings, claims, demands, damages, liabilities, interest, attorney's fees, costs, expenses, and losses of whatsoever kind or nature in connection with or incidental to the performance of this contract, whether arising before or after completion of the Work hereunder, and in any manner directly or indirectly caused, occasioned, or contributed to in whole or in part, or claimed to be caused, occasioned or contributed to in whole or in part, by reason of any act, omission, fault or negligence whether active or passive of CONTRACTOR, its lower tier suppliers, subcontractors or of anyone acting under its direction or control or on its behalf.

The foregoing shall include, but is not limited to, indemnity for:

- a. Property damage and injury to or death of any person, including employees of BECHTEL, OWNER or CONTRACTOR.
- b. The breach by CONTRACTOR of any representation, warranty, covenant, or performance obligation of this contract.

~~CONTRACTOR'S aforesaid release, indemnity and hold harmless obligations, or portions or applications thereof, shall apply even in the event of the fault or negligence, whether active or passive, or strict liability of the parties released, indemnified or held harmless to fullest extent permitted by law, but in no event shall they apply to liability to the extent caused by the sole negligence or willful misconduct of the party released, indemnified or held harmless.~~

11. **SUSPENSION:** BECHTEL may, in its capacity as Agent for OWNER, by written notice to CONTRACTOR suspend the Work under this contract in whole or in part at any time. Upon receipt of such notice, CONTRACTOR shall discontinue work to the extent specified in the notice; continue to protect and maintain the Work; and take any other steps to minimize costs associated with such suspension.

Upon receipt of notice to resume suspended work, CONTRACTOR shall immediately resume performance under this contract to the extent required in the notice.

BECHTEL will in its capacity as Agent for OWNER compensate CONTRACTOR for its efforts in and costs of complying with the notice of suspension in accordance with the Contract plus any additional costs incurred by CONTRACTOR and directly and foreseeably resulting from the suspension, including but not limited to unavoidable demobilization costs not otherwise compensated.

18. **RELEASE AGAINST LIENS OR CLAIMS:** CONTRACTOR shall promptly pay all claims of persons or firms furnishing labor, equipment or materials used in performing the Work hereunder the scope of Work outlined in this Contract. OWNER may, as a condition precedent to any payment hereunder require CONTRACTOR to submit satisfactory evidence of payment and releases of all such claims. If there is any evidence of any such unpaid claim, OWNER may withhold any payment until CONTRACTOR has furnished such evidence of payment and release and shall indemnify and defend BECHTEL and OWNER against any liability or loss arising from any such claim.

SC-2 LIABILITY CAP

Except for CONTRACTOR's indemnity obligations as set forth in SC-1 MODIFICATIONS TO EXHIBIT "A" item 9 titled "INDEMNITY" CONTRACTOR's total aggregate liability arising out of or in connection with this contract shall not exceed 10% of the total amounts paid to CONTRACTOR under the CONTRACT. Under no circumstance shall the CONTRACTOR be liable for special, incidental, indirect or consequential damages including but not limited to loss of revenue or loss of anticipated profit, loss of goodwill, suspended or ceased business activity.

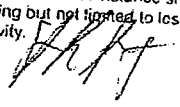


EXHIBIT "C"

FORM A. SCHEDULE OF QUANTITIES AND PRICES

1.0 WORK TO BE PERFORMED

Provision of Supervision for the laying of High Voltage Cables and Technicians to perform the HV Terminations.

2.0 NOT-TO-EXCEED PRICE

The Not-to-Exceed Contract Price for performing all Work is 645,900 (numbers) that is six hundred and forty five thousand nine hundred Euros (words) based on the below rates. The breakdown of this Total Estimated Not-To-Exceed Contract Price is based on estimated quantities as outlined in Table 2.2.

Table 2.1

	Description	Unit of Measure	Unit Rate (Euros)
1.0	Technical Supervision for cable pulling	Per day	750
2.0	Technician for 220 kv HV Terminations	Per day	750
3.0	Technician for 33 kv HV Terminations	Per day	750
4.0	Technician/Supervisor over time rate	Per hour	150
5.0	Lump sum mobilization and demobilization per individual	Per mob/demob	900

Notes:

1. Normal site working week is 60 hrs per week namely 10 hrs per day. (Monday to Saturday).
2. CONTRACTOR shall pay for the above personnel for 10 hr days worked and be reimbursed by BECHTEL on a monthly basis. BECHTEL will sign daily time sheets for the hours Personnel work.
3. BECHTEL will pay in accordance with FORM OF AGREEMENT titled "INVOICING". All invoices to be supported by signed timesheets approved by BECHTEL's authorized Representative.
4. Overtime to be approved in writing prior to commencement of work and will apply to hours worked over 10 hours per day.
5. Lodging and meals will be provided by BECHTEL at the Fjardaal Team Village while Personnel are at the Jobsite.
6. Above rates include costs for miscellaneous small special tools.
7. Mob/Demob includes flights to the Reykjavik, travel time and all expenses.

Table 2.2

Item No.	Description	Estimated Qty
1.0	Technician	842 days
5.0	Mobilization and demobilization per individual	16 return trips

3.0 PERFORMANCE AND PAYMENT SECURITIES

None required for this Contract.

4.0 ADJUSTMENTS

All prices are fixed for the duration of the Contract and are not subject to escalation for any cause. Payment of the Contract Unit Prices shall constitute full payment for performance of the Work and covers all costs of whatever nature incurred by CONTRACTOR in accomplishing the Work in accordance with the provisions of this Contract.

5.0 HOURS

CONTRACTOR understands that BECHTEL makes no commitments or guarantees as to the total amount or final value of the Work to be performed hereunder. Payment under this Contract shall be made on the basis of the actual hours of Work satisfactorily performed by CONTRACTOR as authorized by BECHTEL, in accordance with the prices and payment provisions set forth in this Exhibit "C" and other applicable provisions of the Contract Documents. Should the amount expended under the contract reach 80% of the Total Not-to-Exceed Contract Price then CONTRACTOR shall promptly notify BECHTEL in writing.

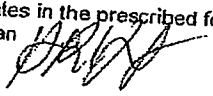
6.0 ICELANDIC VALUE ADDED TAX

CONTRACTOR shall be fully responsible to undertake its own due diligence with respect to its doing business in Iceland for the short duration needed for the performance of its Work, including appropriate consultation with Icelandic governmental authorities and tax advisors as needed. CONTRACTOR'S pricing is exclusive of any Icelandic VAT, income taxes, levies, taxes on benefits, trade union charges and levies, which will be separately paid by OWNER as CONTRACTOR understands based on its due diligence review is required by law. In all other respects, CONTRACTOR shall pay all taxes, levies, duties and assessments of every nature due in connection with the Work and shall make any and all payroll deductions and withholding required by the laws of France and Iceland. CONTRACTOR shall indemnify and hold BECHTEL and OWNER harmless from any liability attributable to its failure to conduct the necessary due diligence on doing business in Iceland or to properly apply the results learned from such due diligence including the foregoing representation as to certain Icelandic tax requirements calling for OWNER payments or for CONTRACTOR's failure to pay any tax, levy, duty or assessment due in connection with the Work or to make the necessary payroll deductions and withholdings required by the laws of France and Iceland. ~~CONTRACTOR'S pricing is exclusive of any Icelandic Value Added Tax (VAT) which will be paid separately by Fjordal as required by law.~~

7.0 REQUIRED SUBMITTALS

The following submittals are prerequisite to payment for mobilization:

- 5.1 Insurance Certificates in the prescribed form.
- 5.2 Safety & Health Plan





Fjarðaál sf.	SCOPE OF WORK Provision of Supervision for pulling of High Voltage cables and Technicians to perform High Voltage Terminations	
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EXHIBIT D

SCOPE OF WORK

1.0 GENERAL

1.1 Work included

CONTRACTOR shall perform all Work including supply of ~~specialized equipment hire~~, technical expertise, supervision and other Work necessary to terminate the following:

- Terminations in oil box, total of 21 single phase 220 kV termination kits.
- Terminations in GIS, total of 21 single phase 220 kV termination kits.
- Terminations to AIS, total of 120 single phase 33 kV termination kits.
- Connection of the cable screens as necessary.
- Testing and Commissioning according to Section 1.4.

CONTRACTOR shall also supervise the laying of 220 kv (total of 7 circuits) and 33kv (total of 15 HV cable). All expertise labour, material and equipment necessary to perform termination assembly shall be included. Labour required to pull the cable will be provided by BECHTEL.

All technical advice of CONTRACTOR shall be professionally considered by BECHTEL.

1.2 Installation conditions

CLIMATE

The climate is strongly influenced by surrounding mountains and the presence of the ocean.

TEMPERATURE

Average (Monthly)	-0.5°C in January (31 F)
	10°C in July (50 F)
Normal Extremes*	-15°C low (5 F)
	25°C high (77 F)

*Temperatures below -15°C and above 25°C are rare.

RELATIVE HUMIDITY

Average Annual	81 percent (%)
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PRECIPITATION

Rainfall (Average Annual)**	1120 mm (44 inches)
Snow (Average Annual)	300 mm (12 inches)
Ice Storms	(Occur periodically)

**October and November are the wettest months with an average monthly rainfall of 185 mm (7.3 inches); May is the driest with an average of about 50 mm (2.0 inches).

WIND

Fastest -45 m/s (100 MPH) from the easterly or westerly direction (5 year return period)
Estimated Peak 10 min. Value 30 m/s (67 MPH) (5 year return period)

Fjarðaál sf.	SCOPE OF WORK Provision of Supervision for pulling of High Voltage cables and Technicians to perform High Voltage Terminations	
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DAYLIGHT

	Hours of daylight
Dec. 22 (winter solstice)	6
Mar. 21 (spring equinox)	14
Jun. 21 (summer solstice)	24
Sep. 23 (fall equinox)	14

1.3 Installation

The terminations will be supplied by CONTRACTOR. All bolts, nuts and supports, and all other items or materials necessary to assemble, erect and install the terminations in a thorough workmanlike manner following the best modern practices will be supplied by others. ~~supplied by others as well as all bolts, nuts and supports, and all other items or materials necessary to assemble, erect and install the terminations in a thorough workmanlike manner following the best modern practices.~~ CONTRACTOR shall supply all labour and tools necessary to complete the Work.

The terminations shall be connected and installed in accordance with the applicable drawings and written instruction prepared by CONTRACTOR and reviewed by the Engineer and according to the applicable codes. CONTRACTOR's written instructions may be augmented or modified by CONTRACTOR's supervising erectors to suit the actual conditions during installation and connection, subject to review by the Engineer.

The following drawings and specifications shall be referenced:

- 24956-310-VIA-EWG0-00004 Description of making Metal-enclosed terminations
- 24956-310-VIA-EWG0-00005 Description of making terminations in transformer tank with resin insulator.

1.4 Field tests

Before operation the terminations shall be subjected to the following tests, carried out in the presence of the Engineer. CONTRACTOR shall prepare test certificate of all results, and submit them to the Engineer in due time.

Before energizing the terminations at least the following tests shall be performed:

- 24 h voltage test at rated voltage.
- Other tests as suggested by CONTRACTOR.

1.5.1 Deliverables

CONTRACTOR to provide appropriate Technician's certificates pertaining to High Voltage.

2.0 WORK EXCLUDED

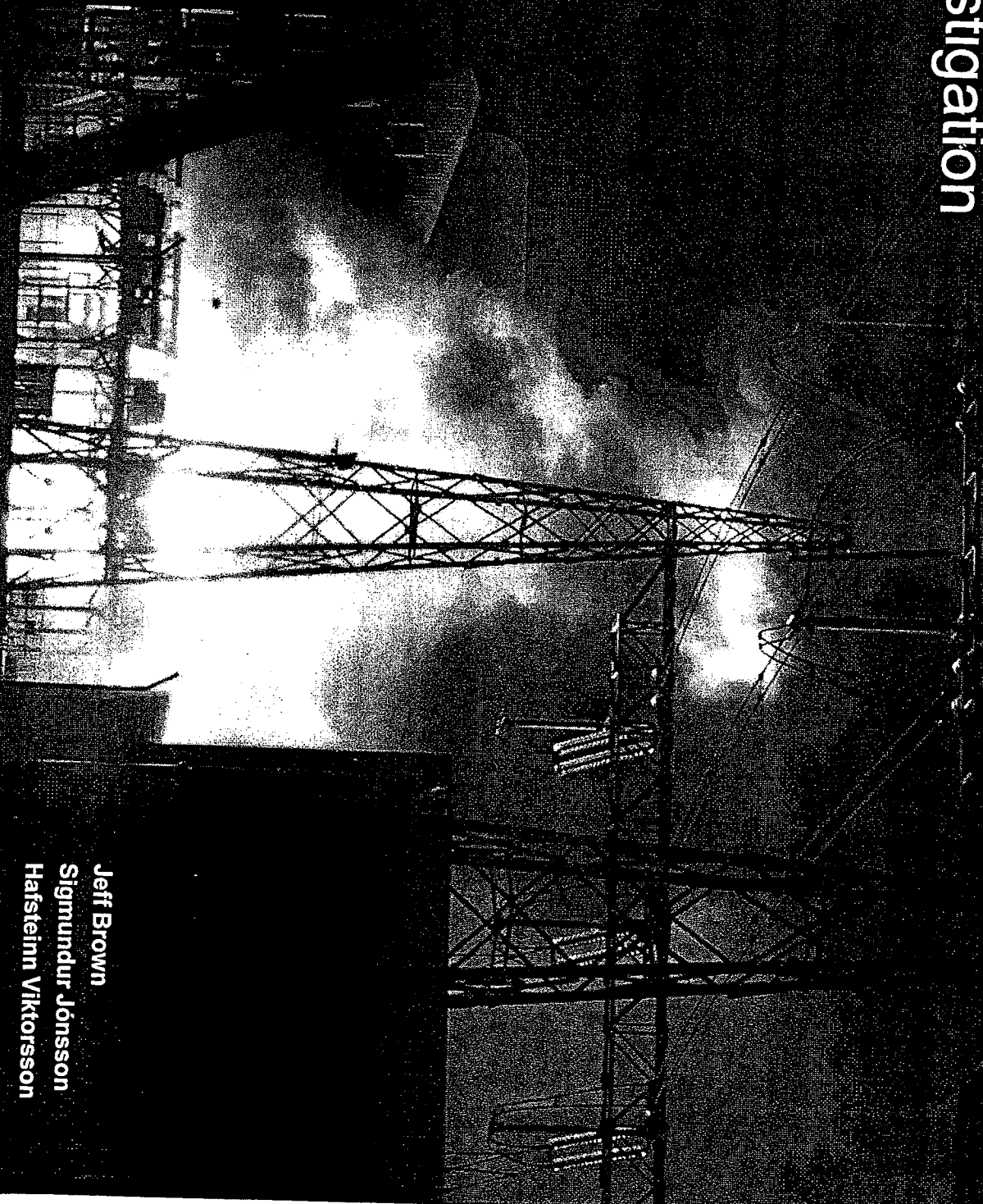
- ⓧ Provision of permanent material under this contract. All permanent material is addressed under separate Purchase Order which carry their own terms and conditions.

CONTRACTOR is not liable in any manner for terminations not assembled by them or for any cables not laid by them.

EXHIBIT C

Alcoa Fjarðaál, Regulating Transformer RF12 Investigation

December 30, 2010



Jeff Brown
Sigmundur Jónsson
Hafsteinn Viktorsson



Overall Position

■ **Insurance:** The deductible is \$50M and the construction warranty has expired. The only relevant avenue is if there is a hidden defect.

▪ **Action:**

- Continue with the root cause analysis.
- Get an independent appraisal of the fault.

■ **Replacement:** It is clear that we will have to get a replacement for the Regulating Transformer. To speed up that process, and not jeopardize the short term relationship with any of the relevant parties (while the root cause is not identified) we plan to proceed with RFA work on a new transformer even if the Root cause and liabilities have not been established.

▪ **Action:**

- Initiate an Emergency RFA for the immediate expenses.
- Continue with the RFA process for a total replacement.

EXHIBIT D



Alcoa Europe

Alcoa Europe SA
Avenue Giuseppe Motta 31-33
CH-1202 Genève, Switzerland
Tél: 41 22 919 6000
Fax: 41 22 919 6100

March 16, 2012

Transmitted via electronic mail and registered post, return receipt requested

Mr. Juan Miró, Senior Vice President
GENERAL CABLE
c/ Rousñol, 63
08560 Manlleu, Barcelona (Spain)

Mr. Josep Martinez, Vice President Business Projects
GENERAL CABLE
Rue de Varennes Prolongée
77876 Monterau Cedex (France)

Re: December 2010 Transformer Fire at Alcoa's Fjardaál Smelter Project

Dear Mr. Miró and Mr. Martinez:

I write regarding the December 18, 2010 transformer fire at Alcoa's Fjardaál smelter near Reyðarfjörður, Iceland (the "Facility").

As was conveyed to Silec Cable ("Silec") during discussions last fall, Alcoa believes that Silec is responsible for the fire and for all damages resulting therefrom. In particular, and based in large part on the independent findings of Kevin Kennedy Associates and KEMA, Alcoa believes that Silec installed a defective cable termination in the W phase of transformer RT-12 at the Facility, which resulted in electrical discharging within the termination and, eventually, a total failure of the transformer. We believe the evidence and the expert reports are conclusive on this point, despite that the 11 October 2011 letter from your legal advisor indicates that Silec takes a contrary view.

We acknowledge that the Dispute Resolution provision of the purchase contract appears to require mediation of certain disputes prior to arbitration. However, we doubt the parties intended the provision to apply to this type of dispute. If Silec believes that a

A handwritten signature in dark ink, appearing to be "JD", is located in the bottom right corner of the page.



Alcoa Europe

Alcoa Europe SA
Avenue Giuseppe Motta 31-33
CH-1202 Genève, Switzerland
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Fax: 41 22 919 6100

mediation would be constructive or is otherwise non-waivable under the Dispute Resolution provision of the purchase contract, Alcoa is willing to go forward with a mediation. However if Silec does not believe that a mediation is necessary, or likely to be productive, we ask that you confirm to us your agreement to waive the mediation requirement of the purchase contract.

In the event that Silec agrees to mediation, we propose to hold the mediation in Pittsburgh, Pennsylvania, USA, the designated venue under the purchase contract, as quickly as can be scheduled. We are prepared to discuss the names of potential mediators and other details regarding the mediation at your earliest convenience.

Please contact me no later than 23 March, 2012 to discuss the details of a mediation to be held as soon as possible, or otherwise respond in writing before that date with Silec's confirmation that it will waive the contractual requirement for mediation. If we do not hear from you before 23 March 2012, we will consider Silec to have waived the mediation requirement and will proceed accordingly.

Very truly yours,

A handwritten signature in black ink, appearing to read "Jose Ramon Camino". The signature is stylized with a large, sweeping "J" and "C".

Jose Ramon Camino